Public Library, and that the collections be offered to the Town Council, and failing acceptance, to the School of Art . . . . It is much to be regretted that the existing Society has not come into possession of the excellent collections and books formed by its predecessor.

* * * *

To complete the record we may here briefly refer to the origin and proceedings of our present Society. These remarks are based on information given in the annual reports, five of which have been issued, commencing with that for 1904 (1903-4).

From the first report we gather that "In November last, stimulated by the action of W. Saville-Kent, Esq., F.L.S., F.Z.S., an endeavour was made to resuscitate the Natural Science Society, hoping that under his influence and guidance the Society might be revived, and regain some of its pristine vigour and activity." Several preliminary meetings were held at Pen Selwood, the residence of Miss Rooper, with the result that officers were appointed and a set of rules adopted, the title of the Society being given as the Bournemouth and District Society of Natural Science. The chief officers were : President, J. E. Beale, Esq., Mayor of Bournemouth; Vice-Presidents, E. Hyla Greves, Esq., M.D., F.R.C.P., W. Saville-Kent, Esq., F.L.S., F.Z.S., F.R.M.S., Rev. E. Linton, M.A.; Chairman of Committee, J. Roberts Thomson, Esq., M.D., F.R.C.P.; Hon. Secretaries, Miss C. Agnes Rooper and Dr. J. R. L. Dixon, M.R.C.S., L.R.C.P.

The Committee reported : "The revival of the Society has been marked by phenomenal success. The membership became 112, and during the session 17 lectures were given" . . . .

The proceedings of the past five years are more or less fresh in the memory of the bulk of the present members. (Then follows a yearly table from which it is seen that the membership grew from 112 to 267, the funds in hand from nil to £20, while the meetings per session increased to 70) . . . .

The year 1909 has been marked by the acquisition of the present commodious rooms in Granville Chambers, Richmond Hill, which constitute a home of the Society such as it never seems to have possessed before.

If each member of the Society in his or her own sphere does his or her best to recruit new members as opportunity offers, and to contribute something original in the way of scientific papers, lectures, notes, or gifts of specimens, etc., we are confident that the Society has a long period of activity and usefulness before it.

BRITISH MUSEUM NATURAL HISTORY

PRESENTED

PRESENTED
20 FEB 1950

PROCEEDINGS
OF THE
Bournemouth Natural Science Society

VOL. XXXIX

SESSION 1948-49

Price - Two Shillings and Sixpence

BRITISH MUSEUM NATURAL HISTORY

PROCEEDINGS of the

Bournemouth Natural Science Society

VOL. XXXIX.

SESSION 1948-49

PUBLISHED BY THE SOCIETY AT ITS HOUSE,
39, CHRISTCHURCH ROAD, BOURNEMOUTH, 1950.

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Introductory Note

The objects of the Society are declared by the second of its rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and in any way that the Council of the Society shall deem advisable."

The branches of Science at present represented are as follows:—**Archæological and Historical, Astronomical, Botanical, Entomological, Geographical, Geological, Microscopical, Photographic, Physical and Chemical, and Zoological.**

During the **Winter Session,** from October to April, frequent meetings are held, comprising Lectures and Demonstrations on subjects of scientific interest, illustrated by lantern slides, films, the epidiascope, diagrams, specimens, and experiments.

Throughout the **Summer Session,** Field Meetings are held in various suitable places in the neighbourhood of the town, or sometimes Coach Tours are arranged to districts of scientific interest at a distance.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting.

The Society possesses a Library available for the use of members. Books may, under certain conditions, be borrowed by members, and there is a Reading Room in which works of reference may be consulted. The Museum, although small, contains many valuable scientific collections and specimens. There is a well-equipped Dark Room for the use of members interested in Photography.

Members are elected by the Council, and pay an annual subscription of £1 10s. 0d. for full membership. An Entrance Fee of 5/- is payable upon nomination for election. The Family Subscription (for members of a family living in the same house) is as follows:—First Adult Member, £1 10s. 0d.; Second Adult Member, £1; each additional Adult Member, 10/-; Children between 12 and 18 years, 5/- (Associate Members). Members living six miles or more from the Square pay half the above rates.

A bi-monthly Programme, giving full details of all meetings, is posted to every member, and a Volume of Proceedings is published each year of which each member receives a copy.

Application Forms for Membership, and further particulars, may be obtained from the Honorary Assistant Secretary,

Miss K. A. HUNKIN, B.A.,
26b Cavendish Road,
Bournemouth. Tel. Bournemouth 2195.

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1949-50.

President

Mrs. W. Boyd Watt, M.B.O.U., F.Z.S.

Chairman of Council

J. F. N. Green, B.A., F.G.S.

Deputy Chairman of Council

S. R. Wycherley, F.R.M.S., F.L.S

Council

The Officers and Chairmen of Sections (*ex-officio*).

Sir G. Alabaster, KT., O.B.E., K.C.
Miss E. Banham
G. Brumell,, A.R.I.B.A. (ret'd.).
Henry Bury, M.A., F.G.S., F.L.S.
Prof. John Cameron, M.D., D.SC.
Major C. L. Cooper-Hunt, M.A., PS.D.
B. Gorton, M.R.C.V.S.
Miss K. Hunkin, B.A.
H. W. Leonard
H. G. Sadler
Miss I. Sheffield
W. C. Simmons, B.SC., A.R.C.S., F.G.S.
H. J. Wadlow

Chairmen of Sections

Archæological and Historical: F. Williamson, F.R.HIST.S.
Astronomical: Conducted by small Committee.
Botanical: E. Chambers.
Entomological: W. S. I. Cox.
Geographical: H. de Castro.
Geological: D. A. Wray, M.SC., PH.D.
Microscopical: S. R. Wycherley, F.R.M.S., F.L.S.
Photographic: A. W. Legat, M.INST.C.E.
Physical and Chemical: H. E. Clarke, M.A., B.SC., F.R.I.C.
Zoological: Mrs. W. Boyd Watt, M.B.O.U., F.Z.S.

Hon. Treasurer

W. J. Woodhouse, A.C.P.,
29, Twynham Road, Southbourne. Tel.: Southbourne 1199.

Secretaries

Hon. Secretary: W. J. Read, M.SC., F.R.I.C.
Hon. Assistant Secretary: Miss K. A. Hunkin, B.A.

Hon. Librarian

A. A. Foyle.

Hon. Editor

Rev. Wilfred E. Lowther.

Hon. Curator

J. F. N. Green, B.A., F.G.S.

Hon Auditors

F. Williamson, F.R.HIST.S., A. A. Foyle.

Hon. Solicitor

G. A. Turner.

Bankers

National Provincial Bank of England, Bournemouth.

COMMITTEES, 1949-50.

Finance and General Purposes:

Chairman : J. F. N. GREEN.

Hon. Treasurer : W. J. WOODHOUSE. *Hon. Secretary* : W. J. READ.

SIR G. ALABASTER, G. BRUMELL, H. BURY, J. CAMERON, E. CHAMBERS, S. WHITAKER, S. R. WYCHERLEY.

Library:

Chairman : W. J. READ.

Hon. Librarian : A. A. FOYLE.

G. BRUMELL, H. E. CLARKE, H. DE CASTRO, H. G. SADLER, F. WILLIAMSON.

Museum:

Chairman-Hon. Curator : J. F. N. GREEN.

Chairman of Archæological Section : F. WILLIAMSON.

Chairman of Botanical Section : E. CHAMBERS.

Chairman of Entomological Section : W. S. I. COX.

Chairman of Geographical Section : H. DE CASTRO.

Chairman of Geological Section : D. A. WRAY.

Chairman of Zoological Section : MRS. BOYD WATT.

E. ST. J. BURTON.

Editorial

Chairman-Hon. Editor : REV. W. E. LOWTHER.

Hon. Treasurer : W. J. WOODHOUSE. *Hon. Secretary* : W. J. READ.

H. BURY, H. E. CLARKE, J. F. N. GREEN.

Garden:

Chairman : H. G. SADLER.

MISS E. BANHAM, H. DE CASTRO, H. W. LEONARD, MRS. LEONARD, ST. J. K. NORTH-ROW, MISS E. WHITAKER.

Entertainment:

Chairman : MISS K. A. HUNKIN.

H. E. CLARKE, MISS I. SHEFFIELD, F. WILLIAMSON.

Astronomical:

Chairman : J. F. N. GREEN.

H. E. CLARKE, S. R. WYCHERLEY.

Summary of the Accounts for the Year ending 30th September, 1949

Receipts.

	£	s.	d.	£	s.	d.
Subscriptions and arrears to Sept., 1949	545	0	0			
Ditto on A/c, Sept., 1950 ...	8	5	0			
				553	5	0
Donations.						
Henry Bury, Esq., for Epidiascope	120	0	0			
Individual	1	1	0			
				121	1	0
Entertainment Committee.						
Garden Party	8	17	3			
New Year Party	16	6	8			
				25	3	11
Rents.						
Empire Society	102	5	0			
Camera Club	53	0	0			
Summer School	60	0	0			
Architects	1	17	6			
Beekeepers (1948)	6	19	0			
Miscellaneous	35	15	0			
				259	16	6
Hire of Hall						
Lantern, Chairs, etc.				1	12	6
Teas Proceeds				7	9	4
Proceeds Excursions				9	17	11
Sale of Surplus				6	13	4
Telephone				2	7	9
Art Exhibition, Mr. Smith ...				7	7	8
Visitors' Box				2	0	6
Interest on Treasury Stock ...				26	16	3
Anonymous Gift re Debentures ...				2605	0	0
Sale of £300 Treasury Bonds (not realised)				—		

Payments.

	£	s.	d.	£	s.	d.
Interest on Debentures to Sept., 1949	118	7	0			
Less Tax at 9/- in £	53	4	10			
				65	2	2
Corporation Duty	5	16	4			
Property Tax, Sch. A	92	5	0			
Rates	117	17	6			
Income Tax Sch. D pending decision of appeal	—					
				215	18	10
Gas, Water and Fuel				131	19	10
Maintenance and Arrears of Repairs	629	7	10			
Insurance of Property	20	5	3			
				649	13	1
Caretaker (Wages and Insurance)...				84	1	6
Garden (Wages and Insurance) ...				67	9	4
Telephone				12	10	9
Minor Repairs and Replacements...				2	6	2
Library				6	19	8
Bank Charges		17	6			
Cheque Book	1	0	0			
National Trust	2	2	0			
S.E. Union	2	2	0			
Ornithological Society ...	1	0	0			
Sundries	16	5	3			
				23	6	9
Secretarial Expenses :—						
Postages				25	17	7
Printing and Stationery ...	65	7	0			
Proceedings	73	1	0			
				138	8	0

		£ s. d.	£ s. d.
Transfer of Deposit A/cs :—			
General Fund		119 9 2	
Debenture Fund		43 19 7	
Building Fund		35 16 3	
Redemption Fund		14 9 5	
Museum Fund		8 9	214 3 2
Cash Balance forward 1948 :—			
Current A/c. ...	83 0 2		
Less unpresented	7 19 5	75 0 9	
Dividend A/c.	5 2 10		
Less unpresented	4 11	4 17 11	
Petty Cash A/c.		9 16 10	89 15 6
			£3932 10 4

		£ s. d.	£ s. d.
Discharge of Debentures			
Anonymous Gift contra ...			2605 0 0
			4028 13 8
Cash Balance 1949 :—			
Current A/c. (overdrawn)	113 1 1		
Add unpresented Cheque	4 12 9	117 13 10	
Dividend A/c.	329 13 9		
Less unpresented	309 18 0		
	19 15 9		
Petty Cash ...	1 14 9	21 10 6	96 3 4
			£3932 10 4

We have examined the above accounts with the Books of the Society and the Vouchers for payment and certify the same to be correct.

A. A. FOYLE,
F. WILLIAMSON, } *Auditors.*

Bournemouth, 10*th* *October*, 1949.

Note.—The special thanks of the Society are due to the following :—

(*a*) The Entertainment Committee and the Tea Committee.
(*b*) Henry Bury, Esq., for the donation to purchase an epidiascope.
(*c*) The anonymous donor of **£2,605** to pay off the debentures.

WILLIAM J. WOODHOUSE,
Hon. Treasurer.

DEPOSIT ACCOUNT.

	£	s.	d.		£	s.	d.
Archæological Research Fund.							
Balance brought forward	10	13	5	Balance on Deposit	10	14	5
Interest to Dec., 1948		1	0				
	£10	14	5		£10	14	5

LEGACY. INVESTMENT ACCOUNT.

	£	s.	d.		£	s.	d.
To Balance forward	1300	0	0	Sale of £300 Treasury Stock :—			
				Cash not yet realised ... £			
				Loss on realisation ... £			
					300	0	0
				Sept. 30th, 1949	1000	0	0
	£1300	0	0		£1300	0	0

LIBRARY ACCOUNT.

Per Mr. A. A. Foyle.

	£	s.	d.		£	s.	d.
30th Sept., 1949.							
Balance	35	19	2	Cash at Bank	35	16	5
				Cash in hand		2	9
	£35	19	2		£35	19	2

Extinction of the Society's Debentures

When the premises at 39 Christchurch Road were "bought by the Society" it was necessary for legal purposes to appoint persons as trustees to undertake the actual purchase of the property and then to hold it as owners on behalf of the Society. As trustees die or retire their places are filled by others appointed in accordance with the provisions of the Trust Deed: the present trustees are Mr. George Brumell, Mr. Henry Bury, Miss Marcia Penrose and Mr. William J. Woodhouse. The trustees have held the property until recently subject to mortgage debentures originally amounting to £3,250, but later reduced to £2,605. Many of our members have no doubt heard by this time of the very generous anonymous gift by which there has been paid into the funds of the Society a sum sufficient to pay off the whole of the capital amount still owing; payment of this amount to the debenture holders has now been actually made, together with interest to the time of repayment, and the trustees now hold the property free from any encumbrance.

We, the trustees, feel that a gift of such magnitude and importance should be duly recorded in the Proceedings of the Society, and have written this letter to ensure that such a record be made, and at the same time to express to our unknown benefactor our very grateful thanks on behalf of every member of the Society. As a result of this gift the Society will now be in a far better position financially than it has ever been, as it will no longer have to pay the yearly interest, which was a first claim on its resources, and used up every year a sum which would otherwise have been—and from now will be—available for the general good of the Society, and for furthering, in a way never before possible, the interests of Science.

(Signed) G. BRUMELL
HENRY BURY
MARCIA PENROSE
WILLIAM J. WOODHOUSE
} Trustees of the Society.

Bournemouth Natural Science Society

List of Members.

Revised to December, 1949.

* HONORARY MEMBERS. † PAST PRESIDENTS.
O ORIGINAL MEMBERS. L LIFE MEMBERS.
A ASSOCIATE MEMBERS.

The year of election is given before the name of each member.

A

1932	Abbott, A. H.	Portman Cottage, 755 Christchurch Road
1932	Abbott, Mrs.	,, ,, ,,
1935	†Ainslie, Instr.-Capt. M.A., R.N. B.A., F.R.A.S.	Grenville, Talbot Drive, Wallisdown
1947	Alabaster, Sir G., Kt., O.B.E., K.C.	34, Pinecliffe Avenue, Southbourne
1947	Alabaster, Lady M., M.B.E.	,, ,, ,,
1947	Alcock, J. W.	24a, Ovington Avenue, Iford
1948	Alcock, Mrs. A.	,, ,, ,,
1948	Alcock, Miss J.	,, ,, ,,
1948	Alcock, Miss M.	,, ,, ,,
1946	Allan, Miss M. W.	6 St. Alban's Crescent
1937	Ansell, Miss E. M.	53 St. Catherine's Road, Southbourne
1943	Appleton, Miss M.	4 McKinley Road
1948	Austin, Mrs. G.	Flat 7, The Cottage, Rothwell Dene, Milner Road

B

1947	Ball, Miss W.	27 Heatherlea Road, Southbourne
1936	Banham, Miss E.	3 Westminster Road East
1912	ABarraclough, A., M.A., F.R.G.S.	93 East Avenue
1948	Barry-Smith, Mrs.	Newlyn, Rossmore Avenue, Parkstone
1939	Bates, T. W.	36 Talbot Avenue
1939	Bates, Mrs. F.	,,
1949	Beale, J. M., M.A.	44 Glenferness Avenue
1949	Beale, Mrs. M.	,, ,,
1944	Bell, T. M., B.A., M.B., B.CH., M.R.C.S., L.R.C.P.	255 Belle Vue Road, Southbourne
1941	Bell, Mrs. R. M.	,, ,, ,,
1945	Bell, M. N.	,, ,, ,,
1945	Bell, R. J.	,, ,, ,,
1942	Bennett, Miss D.	Martello Firs, Martello Road, Branksome Park
1942	Bennett, Miss M.	,, ,,
1948	Bennett, Miss L.	17 St. Peter's Road, Parkstone
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1947	Benton, Mrs. M.	25 Surrey Road
1947	Berrill, Miss M. E.	Heathlands Hotel, Grove Road

1942	Bickel, T. H.	Flat 1, 31 Marlborough Road
1947	Binks, Miss I.	9 Florence Road
1949	Binny, Col.	Dean Park Cricket Ground
1949	Bishop, Miss L.	Pinecourt Hotel, Stourwood Road
1946	Blackmore, H. C., L.D.S., R.C.S.	7 Browning Avenue, Boscombe
1948	Blake, Mrs. D.	26 Pearce Avenue, Parkstone
1942	Boardman, E.	The Datcha, Compton Drive, Parkstone
1944	Borrett, A. C.	12 Montague Road, W. Southbourne
1944	Borrett, Mrs. L.	” ”
1938	Bottomley, Dr. F. C.	1 Beechwood Avenue, Boscombe
1943	Bowden, E. C., F.R.C.S.	Trevose, Riverside Road, West Moors
1947	Bowkett, Miss N.	54 Westby Road, Boscombe
1948	Bowkett, Miss W.	38 Oxford Avenue, W. Southbourne
1944	Bray, F. M., A.M.I.C.E.	90 East Avenue
1948	Brett, Mrs. A.	15 Suffolk Road
1942	Brett, Mrs. R. K.	Aldersmead, Spettisbury
1942	Brimicombe, Mrs. E.	32 Ken Road, Southbourne
1926	*Broad, F., F.S.I. Hon. Member 1947	Manton Villa, 2 Oxford Road
1921	Bromley, Miss	81 Lansdowne Road
1937	Brown, S. C. S., L.D.S., R.C.S., H.D.D.	454 Christchurch Road, Boscombe
1948	Brown, W. S., B.SC.	Three Ways, Dudsbury, Wimborne
1905	*Brumell, G., A.R.I.B.A. (ret'd.) Hon. Member 1933	Maori, 86 Richmond Park Avenue
1920	Brumell, Miss M.	” ” ”
1946	Brummitt, Miss G.	Elderly Nurses' Home, Holdenhurst
1929	Buckingham, H.	7 Richmond Park Avenue
1939	Buckingham, Miss D. G.	” ”
1929	Burge, J. T.	6 Westdown Road, Kinson
1948	Burnley, T.	80 Saxonhurst Road, Ensbury Park
1937	Burrow, Mrs. D. M., B.SC., PH.D.	107 Alumhurst Road
1922	Burton, E. St. J., F.G.S., F.R.S.A.	St. Anne's, Seaward Avenue, Barton-on-Sea
1922	*†Bury, Henry, M.A., F.L.S., F.G.S. Hon. Member, 1947	The Gate House, 17 Alumdale Road
1930	Bury, Miss G. J.	” ” ”
1946	Busby, Miss G.	4 Harbour Close, West Road, Canford Cliffs
1945	Butler, G. W.	Old Park Farm, Lytchett Matravers
1947	Butterworth, J. F.	2 Forest Road, Branksome Park
1948	Butterworth, E. P.	” ”

C

1928	LCalkin, J. B., M.A.	Virginia House, Langton Matravers
1934	†Cameron, J., M.D., D.SC.	63 Grove Road
1946	Carron, Mrs. M.	11 Eaton Road, Bournemouth W.
1939	*†Carpenter, Prof. G. D. Hale, M.B.E., D.M., F.L.S., F.Z.S.	Penguelle, Cumnor Hill, Oxford
1949	Carter, Miss E., M.A.	20 Marlborough Road
1948	Carter, W. A.	27 Brightlands Avenue, Southbourne
1945	Carver, R. B.	38 Elgin Road
1944	Chambers, E.	5a Alexandra Road
1948	Chambers, Miss V.	29 Watcombe Road, Southbourne
1932	Chambers, W. H.	14 Douglas Road, Southbourne
1946	Chaplin, W. A.	11 Folkestone Road, Harnham, Salisbury
1949	Chapman, A. F.	Belvedere, Kingland Crescent, Poole

1945	Cheesman, Mrs. A.	The Ken, Walkford, Christchurch
1948	Cherry, Mrs. B.	Tree Tops, Blake Dene Road, Lilliput
1941	Child, Dr. F.	64a Wellington Road
1945	Child, Miss L.	Seacroft, Grasmere Road, Sandbanks
1912	Chilver, Miss K. M.	2 Shaftesbury Road
1942	Chomé, Mme.	14 Portchester Road
1943	Chomé, Miss J.	,, ,,
1943	Chomé Miss M.	,, ,,
1931	Clark, Miss K. E.	15a St. Mary's Road
1947	Clarke, Miss H.	27 Garland Road, Poole
1945	Clarke, H. E., M.A., B.SC., F.R.I.C.	64b Surrey Road
1945	Clarke, Mrs. M.	,,
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1947	Cockerton, Rev. H. G.	1 Montague Road, Southbourne
1946	Cohen, E., F.Z.S., M.B.O.U.	Hazelhurst, Sway
1943	Cohen, Mrs. J.	,, ,,
1941	Coltar, Miss S. A.	98 The Grove, Redhill Park, Moordown
1949	Concannon, Lt.-Col. M., D.S.O., M.C.	50 Carbery Avenue, Southbourne
1926	Cooper, H. A.	White Lodge, 8 Oban Road
1941	Cooper, Mrs. E. M.	,, ,,
1945	Cooper-Hunt, Major C. L., M.A., PS.D., MS.D., D.D.	19 Marine Drive East, Barton-on-Sea
1945	Cooper-Hunt, Mrs. E.	,, ,,
1948	Cox, W. S. I.	248 Castle Lane
1948	Cox, Mrs.	,, ,,
1922	Crallan, Mrs.	Lansdowne Hotel, Eastbourne
1948	Crawshaw, J.C.	Latchmoor, Mudeford
1949	Crawshaw, Mrs.	,, ,,
1941	Cresswell, Mrs. S. M.	13 Cecil Court, Charminster Road
1948	ACroft, A.	216a High Street, Poole
1931	Curgenven, Miss A. J.	Glendoe, Madeira Road
1903	*oCurtis, W. Parkinson, F.E.S. Hon. Member 1922	17 Christchurch Road

D

1947	d'Aguilar, Lt.-Col. C. B.	United Service Club, Pall Mall, S.W.1
1941	Dailey, Miss K.	134 Western Avenue, Ensbury Park
1946	Darby, Mrs. M.	5 Stokewood Road
1949	Day, J.	60 Brackendale Road
1949	Dearle, Mrs. E.	West Dene Hotel, Alum Chine
1930	de Castro, H.	Yarlington, Springdale Avenue, Broadstone
1945	de Jersey, Mrs. D.	Wimbledon Hall Hotel
1935	Derry, Mrs. E. H.	Charnwood, Belle Vue Road, Southbourne
1947	Dewdney, H. A., F.R.C.O., L.R.A.M.	15 Wellington Road
1941	de Winton, Miss E.	A, 24 San Remo Towers, Boscombe
1948	Dickson, K.	Yenton Hotel, Gervis Road
1949	Dixon, Miss A.	St. Albans, Mansfield Road, Parkstone
1949	Dixon, Miss H.	62 Christchurch Road
1943	Dodd, Mrs. R.	140 Richmond Park Road
1948	Dohoo, E. C.	Pennerley, Blake Hill Crescent, Parkstone
1949	Drayton, Miss A. W.	7 Watkin Road, Boscombe
1946	Drew, Lt.-Col. C. D., D.S.O., F.S.A.	Dorset County Museum, Dorchester

E

1936	Edwards, Charles, M.D.	Lyndon Lodge, 51b Christchurch Road
1936	Edwards, Mrs. H.	,, ,, ,,
1944	Edwards, Miss V.	c/o Westminster Bank, 27 Old Christchurch Road
1935	Elgar, Rev. A. J., F.Z.S.	Forest House, 1 Grove Road
1935	Elgar, Mrs. E. M. K., F.R.G.S.	,, ,,
1946	Ellison, Prof. F. O'B., M.D., F.R.A.S.	Pine Apple Cottage, Burton
1948	Engel, F., L.D.S., R.C.S.	3 Talbot Avenue
1946	Evans, Miss C.	63 Ophir Road

F

1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	,, ,, ,, ,,
1949	Faulkner, H. W., B.A., A.R.S.M.	Pinelands Hotel, Knyveton Road
1934	Finnis, Miss F. M.	15 Julian's Road, Wimborne
1947	Fithian, A. W.	Ewelme, Frankland Crescent, Parkstone
1947	Fletcher, Capt. G.	14 St. Augustine's Road
1946	Flower, Capt.	418 Charminster Road
1946	Flower, Mrs.	,, ,,
1945	Follett, Mrs. V.	Windward, Mayfield Avenue, Parkstone
1942	Ford, Miss C.	13 Beaufort Road, W. Southbourne
1938	Ford, J. C.	3 Harvey Road, Boscombe
1937	Forrest, Miss C. D.	Hiproof, Benellen Road
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1945	Foyle, A. A.	24 R. L. Stevenson Avenue
1948	Francis, Miss E.	Flat 3, Wilton House, Alum Chine Road
1949	Francis, Miss E., B.A.	Thrupp Lane, Stroud
1945	Fraser, Miss L., M.D., B.S.	Bourne Hall Hotel
1942	Freeman, C.	Woodleigh, Durrant Road, Parkstone

G

1949	Galton, R.	5 Beminster Road, Winton
1949	Galton, Mrs. E.	,, ,,
1947	Gompel, Mrs. M.	12 Chigwell Road
1949	Goodhart, Mrs. M.	West Thorpe, Lymington
1942	Gorringe, Miss K.	11 Branksome Dene Road, Westbourne
1927	Gorton, B., M.R.C.V.S.	22 Arnewood Road, West Southbourne
1948	Grant, Col. T. H.	B35, San Remo Towers, Boscombe
1948	Grant, Mrs. F.	,, ,, ,,
1947	Green, Miss F. W.	16 Warnford Road, Boscombe E.
1936	†Green, J. F. N., B.A., F.G.S.	Berkeley Hall Hotel, Cliff Cottage Road
1944	Greg, Mrs. F.	9 Hengist Road, Boscombe
1936	Grieveson, Miss S.	24 Surrey Road
1948	Griffin, J., M.A.	20 St. Ledger's Road
1948	Griffin, J. A.	,, ,,
1949	Grubb, Mrs. W.	7 Meyrick Park Crescent
1941	Gwyther, W. T.	12 Foxholes Road, Southbourne

H

1931	Haines, Mrs. E. M.	Appleslade, Ringwood
1929	LHaines, G. E.	602 Christchurch Road
1948	Hall, Miss A. J.	Daneswood, Wharncliffe Road, Highcliffe
1946	Hall, Miss E.	,, ,, ,,
1937	Hall, Mrs. L. Beeching	Bryn Aird, Blake Hill Crescent, Parkstone
1945	Harding, Mrs. L.	85b, Southbourne Grove
1948	Harding, W. G.	,, ,,
1940	Hardy, G. G.	21 Cassel Avenue, Westbourne
1948	Hardy, Mrs.	,, ,,
1949	Hathornthwaite, Miss E.	Cleasby Grange, Wollstonecraft Road
1932	*Hatton, Mrs.	Dutch House, Cliff Road, Barton-on-Sea
1920	Hawes, Miss	The Moorings, 27 Nelson Road
1949	Hayley, Miss V. G.	12a Castlemain Avenue
1928	Henderson, R. G., M.A., M.B., CH.B. (Aber.), F.R.C.S. (Edin.)	87a Southbourne Road
1944	Hill, Mrs. G.	Wootton, Cliff Drive, Canford Cliffs
1946	Hilton-Johnson, Miss C.	12 Oban Road
1948	Hodgson, W. H.	3 Coy Pond Road
1936	Hunkin, Miss K. A., B.A.	26b Cavendish Road
1930	Hurt, Miss C. E. C. J.	Flat 31, Ingleby, 6 Wimborne Road

I

1925	LInsch, J. M., F.L.S., F.R.M.S.	18 Beechwood Avenue, Boscombe

J

1940	Jackson, Miss E. M., B.A.	Kilmory, York Road, Broadstone
1948	Jackson, J. O.	44 Herberton Road, W. Southbourne
1943	Jaggers, Mrs. E.	15 Elmsway, Southbourne
1942	James, Mrs. E.	Cranmere, Hatherden Avenue, Parkstone
1933	James, Mrs. M. G.	70 St. Alban's Avenue
1947	Jaques, Miss M.	Croft Cottage, Forest Road, Branksome Park
1945	Jenkins, Miss P.	Hinton St. Michael, Christchurch
1933	Johnson, Miss A. C.	25 Avenue Road, Christchurch
1930	Jones, Miss A. Parnell	Yealand, King's Drive, Pagham, Bognor Regis
1945	Jones, S. W., C.M.G.	6 Boscombe Cliff Road
1930	Jubb, Miss O.	12 Oban Road

K

1949	Keating, S. J.	32 Florence Road, Boscombe
1930	†*Keeble, Sir F. W., K.B.E., D.SC., F.R.S	
1928	Kendall, Miss G. J., A.R.C.M.	20 Serpentine Road, Poole

1942	Killick, Mrs. M.	31 Gorsehill Road, Poole
1936	King, Mrs. A.	37 Linwood Road
1946	King, Miss A.	46 Surrey Road
1944	Kirke, Miss M.	Flat 2, St. Cross, 23 Bodorgan Road
1948	Knight, Miss A.	Apia, Fairview Road, Broadstone
1949	Knight, Miss C.	5 Tower Road, Branksome Park
1943	Knight, Mrs. D.	Cornerways, York Road, Broadstone

L

1942	Lanham, Miss O.	31 Gorsehill Road, Poole
1948	Laurie, W. B.	49 Verona Avenue, W. Southbourne
1949	Leathes, Professor J. B., F.R.C.S., F.R.C.P., F.R.S.	43 Grand Avenue, Southbourne
1949	Leathes, Mrs.	,, ,,
1942	Le Fèvre, Miss W.	791a Christchurch Road, Boscombe
1947	Legat, A. W., M.INST.C.E.	6, Thistlebarrow Road
1947	Legat, Mrs. E.	,, ,,
1947	Legat, Miss J. P.	,, ,,
1948	Leonard, H. W.	34 Charminster Road
1948	Leonard, Mrs. N.	,, ,,
1949	Leyborne-Popham, Mrs.	22 St. Stephen's Road
1949	Liddell, D.	22 Marlborough Road
1949	Liddell, Mrs. S.	,, ,,
1947	Logan, Miss A.	1 Branksome Wood Mansions
1947	Lovell, Miss D.	33 Commercial Road, Parkstone
1939	Lowde, Miss E., B.A.	Kilmory, York Road, Broadstone
1934	ALowther, Miss D. M., B.SC.	Lonsdale, Mayfield Avenue, Parkstone
1947	Lowther, Rev. W. E.	7 Watkin Road, Boscombe
1948	Lowther, Mrs. E. L., S.R.N.	,, ,,

M

1908	Mackay, Miss	8 King's Park Road
1929	Mackay, Miss C. J.	,, ,,
1909	*McBean, Miss S. Hon. Member 1949	74 Seafield Road, Southbourne
1944	McLeod, Sir Murdoch, F.L.S., F.R.E.S.	Culverlea House, Pennington, Lymington
1935	McMichael, E.	1 Branksome Wood Mansions, Branksome Wood Road
1930	†*Malmesbury, The Rt. Hon. the Earl of, D.L., J.P.	Heron Court, Christchurch
1948	Markwick, Miss D.	67 Norton Road, Winton
1946	Marshall, Miss D.	125 Kennington Road, S.E.11
1944	Maudslay, A. J.	Carlton House, Barton Court Road, New Milton
1948	Medwin, Miss	274 Castle Lane
1929	Meyrick, Sir George, BART.	Hinton Admiral, Christchurch
1939	Middle, Miss A. M.	Tregenna, Castle Lane
1949	Miles, Miss I.	23 Tower Road, Branksome Park
1934	Mitchell, Miss E. A.	109 Edgehill Road
1949	Moir, Mrs. F.	9 Crossway, Christchurch
1932	Mullins, Miss D. E. A.	Rosemaryne, 111 Edgehill Road
1936	Murdoch, Miss J. C.	3 Rotherfield Road
1935	Muspratt, C. K., M.A., F.R.G.S.	25 East Avenue
1935	Muspratt, Mrs.	,,
1948	Muspratt, Miss R.	44 Lansdowne Road

N

1948	Neil, J.	174 Cranleigh Road, Southbourne
1939	Newsome, S. H.	184 Belle Vue Road, Southbourne
1939	Newsome, Mrs.	,, ,,
1943	LNicholls, Miss G.	41 Corhampton Road
1948	North-Row, St. J. K.	8 Durrant Road

O

1929	Ogden, Miss E.	Vailima, Fairview Road, Broadstone
1948	Ogden, F.	30 Grosvenor Court, Vale Road
1948	Ogden, Mrs. G.	,, ,,
1948	Osborne, Mrs. G.	B6 San Remo Towers
1948	Osborne, C. H.	77 Hengistbury Road, W. Southbourne
1948	Osborne, Mrs. E.	,, ,, ,,
1922	Ousby-Trew, Miss	Overthorpe, Michelgrove Road, Boscombe
1944	Owen, Mrs. E.	2 Rotherfield Road, Boscombe
1929	Owen, J. D.	Barnweill, 42 Strouden Avenue
1929	Owen, Miss M. D.	,, ,,
1945	Owen, W.	7 Dingle Road, Boscombe

P

1948	Pankhurst, Miss D. K.	Alvediston, Waterford Lane, Lymington.
1945	Paris, Lt.-Col. A., R.E. (ret'd.)	10, Carbery Avenue, Southbourne
1946	Parke, Mrs. M.	Solway House, Copse Road, New Milton
1944	Partington, J.	49 East Avenue
1949	Patterson, O.	10 Irving Road, W. Southbourne
1949	Paull, H.	20 Oxford Road
1949	Payne, J. A.	Raydene, Beaufoys Avenue, Ferndown
1949	Payne, Mrs. V.	,, ,, ,,
1945	Penny, Miss A.	Cottonwood, E. Cliff
1916	LPenrose, Miss F.	Little Picket, Hightown, Ringwood
1916	LPenrose, Miss M., B.SC.	,, ,,
1948	Percival, Mrs.	28 Branksome Wood Road
1947	Perkins, Miss E.	Flat 27, 6 Wimborne Road
1948	Pettersson, E. J.	5 Westfield Road, Southbourne
1948	Pettersson, Mrs. W.	,, ,,
1929	Phelps, Mrs. J. V.	Woodbury, East Avenue
1946	Pickering, Mrs. G.	23 Danesbury Avenue, Southbourne
1949	Pontifex, Miss M.	23 Tower Road, Branksome Park
1921	Pontifex, R. D., M.A.	Dalton House, 68 Christchurch Road
1948	Pooley, E.	Welbeck, Danecourt Road, Parkstone
1947	Pope, A. E.	11 Campbell Road, Boscombe
1947	Pope, Mrs.	,, ,,
1941	Popham, Miss C. H., M.B.O.U.	The Flat, Thorney Hill House, Bransgore
1945	Price, W. J., C.M.G., M.INST.C.E.	72 Canford Cliffs Road
1949	Price, Mrs. M.	,, ,,
1946	Prideaux, Mrs. A.	Upmoor, Ravine Road, Canford Cliffs
1946	Prideaux, Miss C.	,, ,,
1949	Prince, Miss D. M., S.R.N.	St. Augustine's Vicarage, St. Anthony's Road

Q

1924	Quick, Mrs.	Tregenna, Castle Lane

R

1912	*Rankin, W. Munn, M.SC. (Leeds), B.SC. (Lond.) Hon. Member 1920	Hawthorne Cottage, Whitchurch Canonicorum, Bridport
1940	Ray, Mrs. B. M.	29 Penrith Road, Boscombe
1946	Rayner, R. A.	16 Oban Road
1946	Rayner, Mrs.	,,
1946	Read, E. W.	19 St. Alban's Avenue
1946	Read, Mrs.	,, ,,
1945	Read, W. J., M.SC., F.R.I.C.	15 Carbery Avenue, Southbourne
1946	Read, Mrs.	,, ,,
1947	Redding, Mrs. C.	35 Linwood Road
1949	Reeves, W. H.	11 Stourwood Avenue
1949	Reeves, Mrs. F.	,, ,,
1924	*Reid, Mrs. E. M., B.SC., F.L.S.	Pinewood, Milford-on-Sea
1946	Retzbach, Miss A. M.	Rothbury, West Cliff Gardens
1945	Richards, Miss E., B.SC.	8 Overcliff Mansions, Manor Road
1928	Richards, Mrs. E. M.	Ralphs Ride, Bracknell, Berks.
1942	Richards, Miss M.	Stour Lodge, Julian's Road, Wimborne
1946	Richardson, J. G.	Baycroft, Rookhill Road, Friars Cliff
1926	Rix, Miss M. E. de B.	Wayside, Stourcliffe Avenue
1947	Roberts, Miss G.	Eagle Hurst, Poole Road
1949	Robertson, Mrs. M.	41 Christchurch Road
1949	Robertson, Mrs. W.	24 Poole Road
1939	Robins, E. A., F.R.P.S., F.L.S., F.R.M.S.	Fairway, Stanley Road, Waterford, Lymington
1929	Robinson, Miss M. H.	Byways, Chaddesley Glen, Canford Cliffs
1929	Robinson, Miss W. A.	,, ,, ,,
1923	Roden, Miss E. M.	12 Walpole Road, Boscombe
1947	Rooke, Dr. K. B., M.B., B.CH., M.B.O.U.	Cranborne, Wimborne
1935	Rush, Miss C. J.	29 Lansdowne Road
1943	Rushton, J.	113 Alumhurst Road

S

1943	Sadler, H. G.	Chester House, Boscombe Spa Road
1947	Saltmarsh, Miss M., B.A., PH.D.	3 Sunnylands Avenue, Southbourne
1942	Sanford, E. G., A.M.I., MECH. E., A.M.I.E.E.	Wellbeck, Danecourt Road, Parkstone
1941	Sanford, Mrs. M. A.	,, ,, ,, ,,
1931	LScudamore, C. E., B.A., L.R.C.P.	24 Hampshire Court
1938	Seare, Mrs. H.	Almer, Blandford
1941	Sexton, Miss F.	60 Uplands Road
1943	Shaw, Miss M. M.	Whitegates, The Grove, Christchurch
1948	Shears, Miss E.	50 Christchurch Road
1933	Sheffield, Miss I. E.	177 Richmond Park Road
1937	Sherwood, Miss H.	420 Charminster Road
1944	LShorthouse, B.	Brookside Cottage, Exeter Lane

1937	†Simmons, W. C., B.SC., A.R.C.S., F.G.S.	Trigonia, Spur Hill Avenue, Parkstone
1937	Simmons, Mrs. I. M.	,, ,, ,,
1920	Simpson, N. Douglas, M.A., F.L.S., F.R.M.S.	Maesbury, 3 Cavendish Road
1948	Sindall, Miss D.	9 Grange Road, Southbourne
1945	Smith, W. G.	22 Stanpit, Christchurch
1947	Smythe, V. du B., F.R.N.S., A.R.P.S.	Sherwood, Irving Road, W. Southbourne
1947	Smythe, Mrs. M.	,, ,,
1947	Sobbe, Miss D.	Manica, Tower Road, Branksome Park
1947	Sobbe, Miss V.	,, ,, ,,
1940	Somerville, Mrs. S.	Rumah Kechil, Pinewood Road, Ferndown
1949	Stanton, H. K.	1097 Christchurch Road
1943	Starling, Miss E. M.	60 The Avenue, Moordown
1948	Stephens, Mrs.	174 Cranleigh Road, Southbourne
1948	Stevens, Mrs. A., F.R.G.S.	43 Hampshire Court
1947	Stuart-Harris, Miss M., B.SC.	Windycroft, Worth Matravers
1946	Stuart-Harris, Miss W., B.SC.	,, ,,
1947	Sykes, Capt. C., M.B.E.	105 Irving Road, W. Southbourne
1947	Sykes, Mrs. E.	,, ,, ,,
1948	Symonds, Miss V.	2 Chessel Avenue, Boscombe

T

1949	Tasker, T. H.	21a Purewell, Christchurch
1945	Taylor, Miss E.	25 Irving Road, W. Southbourne
1937	Terrell, G. H.	53 Wentworth Avenue, Boscombe
1946	Thane, Miss V.	23 Cecil Court, Charminster Road
1948	Thornycroft, L. B.	Plovers Barrows, West Parley
1936	Trayfoot, Mrs. L. W.	25 Eaton Road, Branksome Park
1944	Turner, Miss E. C.	8 Cassel Avenue, Branksome Park
1949	*Turner, G. A. Hon. Member 1949	Winchester House, Fir Vale Road
1914	Twemlow. Miss E. E.	Devon Lodge 83 Alumhurst Road

V

1942	Vickers, H.	St. Giles, Compton Drive, Parkstone

W

1946	Wackrill, Miss D.	1 Crabton Close Road, Boscombe
1947	Wadams, Mrs. E.	75 Bournemouth Road, Parkstone
1924	Wadlow, H. J. Hon. Member 1947	The Gables, Queen's Grove, Parkstone
1921	Wales, Miss	The Nook, 4 Ormonde Road, Branksome Park
1921	Wales, Miss N.	,, ,, ,,
1945	Walker, F.	13 Richmond Park Avenue
1913	Wallace, W. G.	61 East Avenue
1945	Waller, Miss C.	76 Ensbury Park Road
1946	Walsh, J.	13 Richmond Park Avenue
1936	Waltham, T. Ernest	c/o National Provincial Bank, Christchurch Road, Boscombe

1920	LWanstall, W. S.	Del Monte, 6 Roslin Road
1920	LWanstall, Mrs.	,, ,,
1936	Watkin, Ralph, A.K.C., A.M.I.C.E., HON.M.I.E.I.	Avila, Spur Hill Avenue, Parkstone
1949	Watson, Mrs. E.	Beverley Hall Hotel, Manor Road
1941	Watson, Miss G. V.	Chine Hall, Boscombe Spa Road
1948	Watson, Miss W.	30a, Portchester Road
1941	LWatt, Mrs. W. Boyd, M.B.O.U., F.Z.S.	52 Wimborne Road
1946	Watts, Miss N.	3 Dunbar Road
1949	Webb, Miss M.	64 Christchurch Road
1936	Weekes, Mrs. M.	3 Rotherfield Road, Boscombe
1940	West, Mrs. F. M.	Carisbrook 2, Studland Road
1947	West, Miss G.	2 Chessel Avenue, Boscombe
1918	*Whitaker, S. Hon. Member, 1947	22 Somerset Road, Boscombe
1924	Whitaker, Miss E. M.	,, ,, ,,
1924	Whitaker, S. E., P.A.S.I.	22 Selwood Road, Addiscombe, Croydon
1931	AWhite, S. J.	7 Gilbert Road
1942	Williamson, F., F.R.HIST.S.	24a Rushton Crescent
1947	Wilson, Miss G.	9 Glenmoor Road, Winton
1948	AWood, Miss B., B.SC.	4 New Park Road, W. Southbourne
1903	†oWoodhouse, W. J., A.C.P., M.I.H.	29 Twynham Road, Southbourne
1949	Wray, D. A., M.SC., PH.D.	42 Canford Cliffs Road
1949	Wray, Mrs. A.	,, ,,
1932	Wren, G. G.	420 Charminster Road
1949	Wyatt, Mrs. L. M.	61 Boscombe Overcliff Drive
1946	Wycherley, S. R., F.R.M.S.	40 Littledown Avenue, Queen's Park
1946	Wycherley, Mrs. L.	,, ,,

Council's Report for year ending 30th September, 1949

The Council has to report a slight fall in the membership figures. The total is now 438, a decrease of 52 since the end of September of last year. The reason for this is partly that the number of new members joining the Society was smaller than it had been last year, and therefore did not balance the number of resignations which remained approximately the same, and partly, and most regrettably, because of a large increase in the number of deaths among members. Also, at the beginning of the year, when the new List of Members was drawn up, it was subjected to a very careful scrutiny, and the names of some 40 members who had not paid their subscriptions for more than a year, or who had left the town without notifying the Secretary of their change of address, were deleted.

The Society has now only two of its original members left; 11 Past Presidents, 15 Honorary Members, 11 Life Members, and 6 Associate Members are included in the List of Members. Fifty-three new members joined during the year and there were 41 resignations.

It is with the greatest regret that the Council must report the death of the following 17 members:—

Sir Rowland Barran, Professor F. O. Bower, D.Sc., F.R.S. (President of the Society from 1929-30), Mr. M. H. Constantine, Mrs. F. E. Dawes, Mr. E. Dobson, Major H. Henderson, Mr. C. S. Hill, Miss A. Hockey, Mr. T. Littlewood, M.A., B.Sc., Mr. P. R. Lowe, O.B.E., M.B., B.C., M.B.O.U., Mr. N. MacPherson, Mr. M. Making, Mr. J. C. Mummery, A.R.I.B.A., F.R.P.S., Miss E. Pettitt, Mr. A. H. Reid, Major J. S. Rush, O.B.E., Miss G. Trevanion, Mr. C. J. Wainwright, F.Z.S., F.R.E.S.

There have been few changes among the Officers of the Society during the past year. In November of last year, the Council very regretfully accepted the resignation of Mr. G. Brumell from Chairmanship of the Council. Mr. J. F. N. Green was elected Chairman of Council to succeed Mr. Brumell, and, to replace Mr. Green as Deputy-Chairman of Council, Mr. S. R. Wycherley was elected.

Captain Ainslie has unfortunately been obliged by ill-health and increasing deafness to resign the Chairmanship of the Astronomical Section which he had held since 1938. The Council has not yet elected his successor, but has appointed a small committee consisting of Mr. J. F. N. Green, Mr. H. E. Clarke, and Mr. S. R. Wycherley, to carry on the interim work of the Section.

During 1949 there were more lectures and excursions than in the previous year. Eighty-three lectures and meetings were held (13 General and 70 Sectional), and 58 excursions (1 General and 57 Sectional). The corresponding numbers last year were 75 and 53. Six evening lectures were given; these were open to the public without charge and were extremely well attended.

The Presidential Address was given on Saturday, November 6th. There was a very large audience to hear the President, Dr. Edward Hindle, M.A., Sc.D., Ph.D., F.R.S., deliver his address on "The Primates," illustrating his text with films and lantern slides.

The Entertainment Committee gave a New Year Party on January 8th, and a Garden Party on July 23rd. A dramatic entertainment was presented at each event, and both Parties were well attended.

The Annual Art Exhibition was held on November 11th, 12th, and 13th, and was very satisfactorily patronised by members.

It was decided in November to appoint a Committee to revise the Rules of the Society, and on the 21st May a Special General Meeting was called to approve the revision. All members of the Society have been supplied with a copy of the Rules as revised, and as passed at that meeting.

In April, the electricians employed in connection with the repairs being carried out at the Society's house, reported that the whole of the electric installation was in a thoroughly dangerous condition, and that it might produce a fire. It was therefore decided to act at once on this advice, and the whole of the old wiring of the house was replaced by new. New electric points were fitted in the Library and Reference Library, and on the platform in the Lecture Hall.

The programme of repairs decided on in 1947 has been carried on throughout the year. In addition to the original work planned, it has been decided to instal a gas boiler for the heating of the lecture hall and museum. The caretaker's living quarters have been redecorated, with excellent results.

Members will be gratified to hear that the Society has obtained exemption from the regulations of the Town Planning Act. Application has also been made for exemption from Income Tax, but up to date no definite answer has been received.

In July, the Council heard with very great pleasure that an anonymous benefactor had presented the Society with the money necessary to pay off the whole amount of the Debentures. The actual sum so generously presented to the Society was £2,605, and the Honorary Treasurer immediately acted in the matter, with the result that the Society has now paid off all the debentures. The Council passed a resolution of thanks to the anonymous donor, and this was sent to the bank which had conducted the business, with instructions that it should be passed on.

In December of last year, Mr. Henry Bury presented the Society with £120 for the purchase of an epidiascope. Members will have already had experience of the value of this generous gift. A brass plate recording the presentation has been affixed to the epidiascope.

The re-organisation of the Library has been proceeded with, and the Council's thanks are due to the Honorary Librarian, Mr. A. A. Foyle, and to those members who so very kindly helped with this work. An exceptionally large number of books have been presented during the year, the greater part by the relatives of late members. Twenty-four modern books on science and natural history were purchased. Some scientific periodicals and a number of duplicate volumes of "Nature" were sold, and the proceeds were used to defray the cost of the purchase of the new books.

The Garden Committee, under its Chairman, Mr. H. G. Sadler, has worked well throughout the year. The effects of the prolonged drought were not as extensive as might have been expected, and the lawn is quickly regaining its normal appearance. A gift of Heaths from Messrs. Pritchards was much appreciated.

The Council wishes to record its thanks to Mrs. Brimicombe, the able Chairman of the Tea Committee, and to the ladies of the Committee for their continued successful work throughout the year. Thanks are also due to the members of the Lanternists Committee, who have continued their work with the lantern and epidiascope—a work which, although essential to the Society, may not receive from members the congratulation which it deserves. Through the Council, also, the Society thanks all those, and they are many, who have during the past year presented gifts to the Museum and Library.

Meetings, Field Meetings and Visits, Session 1948-9

GENERAL.

Nov. 6th 1948. Presidential Address: "Primates," by Dr. Edward Hindle, M.A., Sc.D., Ph.D., F.R.S. (Scientific Director of the Zoological Society of London and Secretary of the British Association for the Advancement of Science).
Mar. 16th 1949. Visit to the Kemp Welch Modern School. Leader, W. J. Woodhouse, A.C.P.
May 21st 1949. Special General Meeting.
Oct. 29th 1949. Annual General Meeting.
Nov. 10th to 12th 1949. Art Exhibition.

ENTERTAINMENTS.

Jan. 8th 1949. New Year Party: Dramatic Entertainment, etc.
July 23rd 1949. Garden Party.

CLUB DAYS.

Twelve were held during the session, at which there were talks on Science and Philately by W. S. I. Cox, Monkeys by B. Gorton, M.R.C.V.S., Gilbert White of Selborne by Mrs. Boyd Watt, M.B.O.U., F.Z.S.; also, illustrated by specimens, talks on Egyptian History by J. F. N. Green, B.A., F.G.S., and British Immigrant Butterflies by W. S. I. Cox; and, during the summer, a series of Exhibitions of Flowers.

SECTIONAL.

Nov. 4th 1948. Garibaldi, by Dr. C. E. Scudamore, B.A.
Dec. 4th 1948. Rome, by Emeritus Prof. John Cameron, D.Sc., M.D.
Jan. 18th 1949. What is your Name? by F. Williamson, F.R.Hist.S.
Feb. 3rd 1949. The Origin of Wessex, by F. Williamson, F.R.Hist.S.
Feb. 24th 1949. 2,000 Years of Coins, by V. du Bedat Smythe, F.R.N.S., A.R.P.S.
Mar. 3rd 1949. English Period Furniture and Furniture Woods, by W. G. Smith.
Mar. 14th 1949. Japanese Sword Mounts, by S. R. Wycherley, F.R.M.S., F.L.S.
Mar. 21st 1949. The Industrial Revolution; discussion opened by Miss K. A. Hunkin, B.A.
May 26th 1949. Visit to Old Sarum and Salisbury Cathedral. Leaders, F. Williamson, F.R.Hist.S., Major Shortt, Mr. W. A. Chaplin.

July 7th 1949.	Visit to Parley Green, Gibbet Firs and Moated Farm. Leader, Miss K. Chilver.
July 13th 1949.	Visit to Winchester. Leader, F. Williamson, F.R.Hist.S.
Sept. 29th 1949.	Visit to Wimborne Minster. Leader, F. Williamson, F.R.Hist.S.
Oct. 8th 1949.	The Story of the Hearth, by F. W. Robins, F.S.A., F.R.G.S.
Oct. 27th 1949.	Stone Implements and the Dawn of Human Technology, by Major J. E. L. Carter, M.C., R.E.

Astronomical.

Mar. 23rd 1949.	Saturn, by Prof. F. O'B. Ellison, M.D., F.R.A.S.

Biological.

Oct. 22nd 1949.	Soviet Biology, by H. Bury, M.A., F.G.S., F.L.S.

Botanical.

Apr. 7th 1949.	Fungi and their Ways, by Dr. John Ramsbottom, O.B.E., M.A., F.L.S.
Apr. 19th 1949.	Walk from Lytchett Matravers to Beacon Hill Corner. Leader, Miss Banham.
Apr. 22nd 1949.	Walk from Mudeford via Chewton Glen to Hinton Admiral. Leader, Miss K. Gorringe.
Apr. 27th 1949.	Visit to Holmsley (Wilverley Enclosure). Leader, H. Bury, M.A., F.G.S., F.L.S.
Apr. 30th 1949.	By Coach to Riseley and Sindlesham. Leader Miss Banham.
May 4th 1949.	Visit to Spettisbury. Leader, H. Bury, M.A., F.G.S., F.L.S.
May 6th 1949.	Visit to Parley Wood and Wood Town. Leader, Miss K. Chilver.
May 10th 1949.	Walk from Bloxworth to Bere Regis. Leader, Miss Banham.
May 16th 1949.	Walk from Canford Magna to Broadstone. Leader, Miss K. Gorringe.
May 20th 1949.	Visit to Wareham Water Meadows. Leader, H. Bury, M.A., F.G.S., F.L.S.
May 24th 1949.	Visit to Wool (Cole Wood). Leader, H. Bury, M.A., F.G.S., F.L.S.
May 31st 1949.	Visit to Corfe (Blashenwell). Leader, H. Bury, M.A., F.G.S., F.L.S.
June 10th 1949.	By coach to Burley, Hatchett Pond and Beaulieu Wood. Leader, Miss Banham.
June 13th 1949.	Visit to Holmsley (Wootton Copse). Leader, H. Bury, M.A., F.G.S., F.L.S.

June 15th 1949.	Visit to Littlesea. Leader, Miss Banham.
June 18th 1949.	Walk through Upper Gardens. Leader, Miss Banham.
June 28th 1949.	Walk near Guss. Leader, H. G. Sadler.
July 1st 1949.	Visit to Swanage. Leader, Miss Gorringe.
July 5th 1949.	By coach to Breamore (Miz-Maze). Leader, Miss Brumell.
July 11th 1949.	Visit to Wareham and Ridge. Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
July 18th 1949.	Walk from Lytchett Matravers to Beacon Hill Corner. Leader, Miss Banham.
July 26th 1949.	Visit to Corfe (Scotland Farm). Leader, Miss Ogden.
Aug. 3rd 1949.	Visit to Parkstone Golf Course and Luscombe. Leader, Miss Banham.
Aug. 6th 1949.	Walk through Chriscthurch Meadows. Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Aug. 9th 1949.	Visit to Wool (Cole Wood). Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Aug. 15th 1949.	Walk from Bloxworth to Bere Regis. Leader, Miss Banham.
Aug. 26th 1949.	By coach to Buckler's Hard and Beaulieu. Leader, Miss Banham.
Aug. 31st 1949.	By coach to Hod Hill and Tarrant Valley. Leader, H. de Castro.
Sept. 6th 1949.	Visit to Slepe Heath. Leader, Miss Banham.
Sept. 9th 1949.	By coach to Keyhaven and Hurst Castle. Leader, E. A. Robins, F.R.P.S., F.L.S., F.R.M.S.
Sept. 14th 1949.	Visit to Corfe. Leader, Miss Ogden.
Sept. 16th 1949.	Visit to Hengistbury Head. Leader, Miss K. Gorringe.
Sept. 23rd 1949.	Visit to Throop Meadows and Haddon Hill. Leader, Miss I. Sheffield.
Oct. 1st 1949.	Visit to Broadstone (Roman Road). Leader, Miss Ogden.
Oct. 18th 1949.	Fungus Foray, Brockenhurst. Leader, A. A. Pearson, F.L.S.

Entomological.

Mar. 31st 1949.	Butterflies found near Bournemouth, by W. S. I. Cox.
July 9th 1949.	Visit to Fontmell Magna. Leader, S. C. S. Brown, L.D.S., R.C.S., H.D.D.

Geographical.

Nov. 27th 1948.	The Chalklands of Dorset, by W. J. Woodhouse, A.C.P.
Jan. 15th 1949.	The Making of Scenery, by S. R. Wycherley, F.R.M.S., F.L.S.

Feb. 26th 1949.	Hong Kong, by Sir Grenville Alabaster, Kt., O.B.E., K.C.
Mar. 19th 1949.	More Memories of Old Bournemouth, by W. J. Woodhouse, A.C.P.
Mar. 26th 1949.	Russia, by Sir William Seeds, K.C.M.G.
Apr. 29th 1949.	Visit to Shaftesbury and Lama Tree. He de Castro.
May 28th 1949.	Visit to Shepton Mallet, Croscombe and Wedmore. H. de Castro.
June 25th 1949.	Visit to Stourhead Gardens and Alfred's Tower. H. de Castro.
July 16th 1949.	Visit to Longleat House and Heaven's Gate. H. de Castro.
Aug. 20th 1949.	Visit to Golden Cap and Marshwood Vale. H. de Castro.
Sept. 3rd 1949.	Visit to Bulbarrow, Haselbury Bryan and Piddletrenthide. H. de Castro.
Oct. 15th 1949.	Cambridge and its Colleges, by H. Lawrence White.

Geological.

Nov. 23rd 1949.	Some Geological Problems, by H. Bury.
Jan. 22nd 1949.	British Volcanoes, by J. Fredk. N. Green, B.A., F.G.S.
Apr. 2nd 1949.	The Effect of Geology on the Distribution of the Dorset Flora, by Wm. C. Simmons, B.Sc., A.R.C.S., F.G.S.
Aug. 24th 1949.	By coach to Examine the Terraces of the Avon and Stour. J. Fredk. N. Green, B.A., F.G.S.
Oct. 12th 1949.	The Making of Scenery, by S. R. Wycherley, F.R.M.S., F.L.S.

Microscopical.

Nov. 18th 1948.	A Demonstration of the Mounting of Microscopic Objects, by S. R. Wycherley, F.R.M.S., F.L.S.
Dec. 2nd 1948.	The History of the Microscope, by S. R. Wycherley, F.R.M.S., F.L.S.
Dec. 16th 1948.	Diatoms, Polycistina and Foraminifera: some account of their Structure, by S. R. Wycherley, F.R.M.S., F.L.S.
Jan. 20th 1949.	The Zenith of British Microscope Manufacture, by A. W. Legat, M.Inst.C.E.
Feb. 17th 1949.	Crystals under the Microscope, by H. E. Clarke, M.A., B.Sc., F.R.I.C.
Mar. 17th 1949.	Microscope Practice: Surface Illumination, Oblique and Vertical, demonstrated by S. R. Wycherley, F.R.M.S., F.L.S.

Apr. 21st 1949.	Microscope Technique Reviewed, by S. R. Wycherley, F.R.M.S., F.L.S.
May 19th 1949.	Specimens of Botanical, Zoological and Pond Life. S. R. Wycherley, F.R.M.S., F.L.S.
June 16th 1949.	Specimens of Botanical, Zoological and Pond Life. S. R. Wycherley, F.R.M.S., F.L.S.
July 21st 1949.	Specimens of Botanical, Zoological and Pond Life. S. R. Wycherley, F.R.M.S., F.L.S.
Aug. 18th 1949.	Specimens of Botanical, Zoological and Pond Life. S. R. Wycherley, F.R.M.S., F.L.S.
Sept. 15th 1949.	Specimens of Botanical, Zoological and Pond Life. W. J. Woodhouse, A.C.P.
Oct. 20th 1949.	Cell Structure with special reference to Karyokinesis, by E. Chambers and S. R. Wycherley, F.R.M.S., F.L.S.

Photographic.

Dec. 14th 1948.	Japan (Part 1), by Major C. L. Cooper-Hunt, M.A.
Jan. 11th 1949.	Lesser-known Features of Salisbury Cathedral, by W. A. Chaplin.
Mar. 8th 1949.	1948 Excursion Memories, Part 1, by A. W. Legat, M.Inst.C.E.
Mar. 15th 1949.	1948 Excursion Memories, Part 2, by A. W. Legat, M.Inst.C.E.
Apr. 12th 1949.	Making a Bromoil Transfer, by Ralph Harding.
Apr. 26th 1949.	American Holiday, 1948, by P. Clissold.
Sept. 30th 1949.	Swiss Holiday: Lugano, by A. W. Legat, M.Inst.C.E.
Oct. 11th 1949.	The Glories of Venice To-day, by S. R. Wycherley, F.R.M.S., F.L.S.

Physical and Chemical.

Nov. 25th 1948.	Chemical and Bacteriological Notes on the Blue Pool, near Wareham, by A. S. Carlos, B.Sc., F.R.I.C., and H. E. Clarke, M.A., B.Sc., F.R.I.C.
Dec. 9th 1948.	The Spectroscope and the Atom, by Miss M. O. Saltmarsh, B.A., Ph.D.
Jan. 13th 1949.	The Wind and the Rain, by H. E. Clarke, M.A., B.Sc., F.R.I.C.
Feb. 12th 1949.	Recent Work in Radiation, by H. E. Clarke, M.A., B.Sc., F.R.I.C.
Mar. 5th 1949.	Crystals, by A. E. Robinson, B.Sc., A.R.I.C.

Zoological.

Nov. 20th 1948.	Tropical Aquarium Fish, by Members of Bournemouth Aquarists' Club.
Dec. 11th 1949.	Evolution of Vertebrate Limbs, by H. Bury, M.A., F.G.S., F.L.S.
Dec. 18th 1948.	Uplands and Downlands of Wiltshire, by W. A. Chaplin.
Jan. 29th 1949.	The Zoophytes: Polyzoa, Hydrozoa and Anthozoa, by S. R. Wycherley, F.R.M.S. F.L.S.
Feb. 5th 1949.	Animals in Fresh and Salt Water, by H. Bury, M.A., F.G.S., F.L.S.
Feb. 19th 1949.	Towards a Closer Acquaintance with Cormorants and Shags, by J. C. Follett.
Mar. 10th 1949.	Zoological Films, with Commentary by Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Mar. 29th 1949.	Hydra, by T. Marshall Bell, B.A., M.B., M.R.C.S., L.R.C.P.
Apr. 9th 1949.	Some Animals I have Met, by B. Gorton, M.R.C.V.S.
Apr. 14th 1949.	Reptiles and Amphibia in Britain, by Alfred Leutscher, B.Sc., F.Z.S.
May 14th 1949.	Stanpit Marshes (Bird Study). Leader, Miss C. Popham, M.B.O.U
June 2nd 1949.	Visit to Abbotsbury Swannery. Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Sept. 27th 1949.	Visit to Leckford Abbas, Stockbridge (Private Collection of Wild Fowl). Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Oct. 4th 1949.	Visit to Zoological Gardens, London. Leaders, Mrs. Boyd Watt, M.B.O.U., F.Z.S., and the President, Dr. Edward Hunter, F.R.S., etc.
Oct. 6th 1949.	Stanpit Marshes (Bird Study). Leader, Miss C. Popham, M.B.O.U.
Oct. 25th 1949.	More Animals I have Met, by B. Gorton, M.R.C.V.S.

Evening Meetings.

Nov. 10th 1948.	Life in Medieval England, by F. W. Robins, F.S.A., F.R.G.S.
Dec. 8th 1948.	Bournemouth Holiday, by A. W. Legat, M.Inst.C.E.
Jan. 12th 1949.	Vesuvius, Pompeii and Herculaneum, by E. A. Robins, F.R.P.S., F.R.M.S., F.L.S.
Feb. 9th 1949.	Rambles in Dorset, by H. de Castro.
Mar. 9th 1949.	Zoological Films, with Commentary by Mrs. Boyd Watt, M.B.O.U., F.Z.S.

Apr. 13th 1949.	The Microscope for Leisure and Pleasure, by S. R. Wycherley, F.R.M.S., F.L.S., assisted by W. J. Woodhouse, A.C.P., and A. W. Legat, M.Inst.C.E.

COMBINED SECTIONAL MEETING AND VISITS.

Botanical and Geological.

June 23rd 1949.	Visit to Corfe (East Hill). Leader, H. Bury, M.A., F.G.S., F.L.S.
July 20th 1949.	By coach to Chapman's Pool. Leaders, Miss Banham and Dr. Wray, M.Sc.
Aug. 12th 1949.	By coach to Lulworth Cove and Durdle Door. Leader, Dr. Wray, M.Sc.

Botanical and Zoological.

Apr. 5th 1949.	Visit to Hinton Admiral. Leader, Miss Banham.
June 3rd 1949.	Visit to Studland and Ballard Down. Leader, Miss Banham.
Sept. 12th 1949.	Poole Harbour to Wareham by Motor Launch. Leader, Mrs. Boyd Watt, M.B.O.U., F.Z.S.
Sept. 20th 1949.	By Coach to the Blue Pool. Leader, H. G. Sadler.

Photographic and Zoological.

Feb. 8th 1949.	How I Photograph Animals, by Ursula M. Ogle.

Geographical and Photographical.

Nov. 16th 1948.	Mid-Kent in Colour, by A. W. Legat, M.Inst.C.E.
Jan. 27th 1949.	The Channel Islands—Guernsey, Alderney, Sark and Herm, by A. W. Legat, M.Inst.C.E.
Feb. 15th 1949.	Japan (Part 2), by Major C. L. Cooper-Hunt, M.A.

Reports for the year ending September 30th, 1949

Library

The re-organisation of the Library has been proceeded with, on the principle of keeping together all books on the same subject.

The books are arranged alphabetically under the author's names, except in the case of books on local archæology, geology, history and travel, where they are in alphabetical order of the district concerned.

A number of books, considered by the Committee as obsolete and of no interest to members, are being weeded out, and duplicate volumes are being offered to the National Central Library.

449 books and periodicals were borrowed by members during the year.

A year's parts of "Nature" have been bound, and it is proposed to have bound 22 volumes of "Antiquity," covering the years 1st January, 1927, to 31st December, 1948.

The Committee received with much regret the resignation of Mr. Brumell from the Chairmanship. Mr. W. J. Read was elected in his stead.

Mrs. Perceval has very kindly given regular help in the work of the Library.

A number of duplicate volumes of "Nature" were sold and also a quantity of back numbers of the journals of the Royal Chemical Society. The proceeds have been used for the purchase of modern books.

Mr. Bury, Dr. Fountain, Mr. Green and Miss Penrose have continued their gifts of periodicals, and books have been lent to the Library by Mr. Waltham.

Gifts of books have been received from Dr. Cameron, Miss Constantine, Rev. Dixey, Mr. Green, Dr. Hindle, Mr. Legat, Miss Lowther, Miss McBean, Miss Penrose, Mr. Read, Mr. Waltham and Mr. Watkin.

A total of 218 books have been added to the Library, consisting of 194 books presented by the above donors and 24 recently published boks which have been purchased on the recommendation of the Library Committee, listed below:—

Books Purchased

Geographical Handbook of the Dorset Flora. R. Good.
Early Man. A. H. Brodrick.
British Plant Life. W. B. Turrill.
The Glories of Winchester Cathedral. R. Birt.
Nature and Camera. O. G. Pike.
Mammals in Britain. M. Blackmore.
Colour Photography Transparencies. C. L. Thomson.
Directory of Natural History Societies. H. K. A. Shaw.
History of Poole. H. P. Smith.

White Horses and other Hill Figures. M. Marples.
The Badger. E. Neal.
British Regional Geology—Hampshire Basin. C. P. Chatwin.
S.W. England. H. Dewey.
A Butterfly Book. Edmund Sandars.
English Rivers. John Rodgers.
Climate Through the Ages. C. E. P. Brooks.
Progress in Science. W. L. Sumner.
Natural History, 1946. C. Tate Regan.
The Sea Shore. C. M. Yonge.
Britain's Green Mantle. A. G. Tansley.
Lascaux: A Commentary. A. H. Brodrick.
The Glories of Salisbury Cathedral. Jeffrey Truby.
Dragonflies of the British Isles. C. Longfield.
Grasses, Sedges, Rushes and Ferns. N. B. Hodgson.

(Signed) A. A. FOYLE,
Hon. Librarian.

Museum

During the past year work has chiefly been devoted to the conchological department. The Crallan collection of exotic mollusca has been rearranged in one of the two cabinets previously filled by it; and four collections of British land and freshwater mollusca have been amalgamated. This has released space which is being utilised in connection with revision of the Tertiary fossils, now in progress.

Additions to the museum include a spider's web, mounted by Mr. T. E. Waltham; a speciment of the hornblende-granite of "Cleopatra's Needle," given by Mrs. Cheesman; and flints showing various types of working and fracture, presented by Mr. Bury and the Curator. A stereoscope with 25 hand-painted pictures of flowers, etc., mounted on a stand, presented by Mr. Waltham, has been very attractive to members and visitors.

(Signed) J. FREDK. N. GREEN,
Hon. Curator.

Garden Report

Four decayed pine trees, in danger of being blown down by the high winds which prevailed during the winter, were felled and the boughs of certain others lopped.

Messrs. Pritchards, of Christchurch, have presented the Society with six young heath bushes, in replacement of a similar number (also their gift) which had died during recent years.

An incinerator for the burning of noxious weeds has been purchased.

The prolonged drought has been responsible for the loss of some herbaceous plants, but the lawn does not appear to have permanently suffered.

(Signed) H. G. SADLER,
Chairman.

Archaeological and Historical

A full list of lectures and field meetings is set out on another page, so that it is not necessary to duplicate it here. Five excursions have been held of definite archæological interest—to Badbury Rings, Old Sarum and Salisbury, Parley Green, Winchester, and Wimborne Minster. At Old Sarum we had the advantage of explanations of the site from Major Shortt, of the Salisbury Museum, and at the Cathedral we were taken round by one of our own members, Mr. W. A. Chaplin. At Winchester, we visited the Westgate Museum and the Cathedral, and have now visited the principal places of interest in the old city. Eleven lectures have been given, chiefly by our own members; but special reference should be made to two non-members to whom we are indebted for interesting and instructive lectures, namely, Dr. W. A. Wigram for a lecture on "The Acropolis of Athens," and to Mr. F. W. Robins on "Life in Medieval England."

We are grateful to all who have contributed to the work of this section, either by leading field excursions or by lecture, and to them our thanks are offered. During the coming year the Chairman will be glad to receive offers of help from members, or suggestions which would in any way enhance the work of this section.

(Signed) F. WILLIAMSON,
Chairman.

Botanical

We report with regret the resignation of our Chairman, for reasons of health, early in the session. Since then the duties have been carried on by a committee of three. In July, Mr. Bury was unfortunately taken ill and forced to retire temporarily. Also, our invaluable Secretary, Mr. Wadlow, though still keeping our records, can only join us occasionally. Both these gentlemen have done splendid work for our Section, Mr. Bury since 1922 and Mr. Wadlow since 1924. We are happy to welcome back to Bournemouth our much-esteemed former Chairman, Mr. E. Chambers, and are glad to know that he is able to resume his previous office.

Despite drawbacks, the Botanical Section has been very active throughout the spring, summer and autumn. We have had twenty-eight rambles and six coach outings entirely botanical, one ramble and one coach outing jointly with the Zoological Section, also one by motor launch; two botanical and geological rambles and two coach outings. Also we have held six exhibitions of wild flowers on Club Days. In April we had the great privilege of a lecture on Fungi by Dr. Ramsbottom, and we look forward to again joining the Hampshire Field Club for another Fungus Foray in the New Forest under Mr. Pearson's skilled leadership. Another outstanding event was the coach outing in

April to the native habitats of the interesting Fritillary flowers (Fritillaria meleagris), and the so-called "Lodden lily" or summer snowflake (Lencojum æstivum). This was made possible by the co-operation of the President of the Reading Natural History Society. We have also been introduced to new happy hunting grounds by the President of the Southampton Natural History Society, and we hope, another season, to extend such contacts. Records of flowering plants found are being kept by Mrs. Boyd Watt and Mr. Wadlow.

We shall be happy to welcome botanists able to join us and strengthen our Section. (Signed) E. R. BANHAM.

Entomological

During the past year the Butterflies in the largest of the Society's Cabinets have been re-named with up-to-date titles in both English and Latin. Previously the insects had only been labelled in Latin and many of the labels were obsolete and some were missing. A number of damaged Butterflies had to be removed, but in no case was any species denuded of representative specimens. The Collection, as a whole, contains a fair proportion of varieties of the standard type of each Butterfly.

The excursions this year have not yielded as many specimens of Lepidoptera as is usual in the districts visited. This is partly due to the fact that the days in question were often windy.

Quite a number of members have come across the larvae of several of our Hawk moths during the past season.

The many sunny days we have had this summer have caused certain butterflies to rest on flowers with expanded wings for longer periods than usual.

A large number of specimens of the Painted Lady (Vanessa Cardui) were seen in Bournemouth towards the end of September, and as they were remarkably fresh it is improbable that they were visitors from overseas.

Many more specimens of the Clouded Yellow (Colias Croceus) have been on the wing than usual, and it is gratifying to note that one example of the rare Pale Clouded Yellow (Colias Hyale) was seen in a Lucerne field near Bournemouth.

(Signed) W. S. I. COX,
Chairman.

Geographical

The year 1948-49 has been a very satisfactory one for the Section. There were ten Geographical Lectures, five of which were joint with the Photographical Section.

Summer outings numbered six, all being coach excursions. They were very well attended, especially the excursion to Seatown and Pilsdon Pen.

(Signed) H. DE CASTRO,
Chairman.

Microscopical

The interest of members of the N.S.S. in the Microscopical Section has been maintained. Assistance has been given by members to make the demonstrations effective, and a growing interest in microscopic technique has been shown. During the summer months the afternoons have been thrown open mainly to the examination of Botanical subjects, Insects and Pond life brought by members. A microscopic telescope was used and found useful to examine live insects of various kinds brought by members. Pond Life objects were also projected on the screen by the projecting microscope. A microscopic evening for the general public was arranged, and a splendid battery of microscopes set up with the assistance of Mr. W. J. Woodhouse. Great interest was shown by the audience that crowded the room. During the coming session Chairmen of some of the Sections are being asked to introduce the afternon's demonstration with a short talk on their particular subject, which will be followed by microscopic slides illustrating their remarks. An instructional class on microscopic technique is also being arranged.

(Signed) S. R. WYCHERLEY,
Chairman.

Photographic

During the year fifteen meetings have been held sponsored by this Section, and all have been well attended. No special photographic expeditions have been arranged as it was considered that expeditions by other Sections provided adequate opportunity for photography. An interesting programme, including some lecturers new to the Society, is being arranged for the coming winter.

Attention is again called to the extremely well equipped Dark Room at 39 Christchurch Road. Members are making little use of this facility, which is available daily except Fridays and Sundays. Any further information regarding it will be supplied on application.

(Signed) W. A. LEGAT,
Chairman.

Physical and Chemical

We have been successful during the year in securing for the Section the fruits of original research work carried out by Mr. A. S. Carlos, B.Sc., F.R.I.C., Public Analyst for Poole. This work is published in the present "Proceedings."

The most important advances announced this year in Physics are probably those in Cosmic Radiation and in the post-Bragg study of Crystals, especially of elaborate organic substances.

Lectures have therefore been given on Radiation (especially in relation to the researches on Mesons and the biological aspects of cosmic and therapeutic rays), and on Crystals, an additional joint session with the Microscopic Section enabling members to study the applications of polarised light to the grouping and identification of crystalline material.

A lecture was delivered on the physical approach to Astronomy, when reference was made to the forthcoming use of the great 200-inch Mt. Palomar reflector, for study of the nature of our own expanding universe and of the myriads of " island universes " outside the Galaxy. Reference was also made to the physical methods used for estimation of the brightness, temperature, velocity and magnitude of nebulae, and for the nature and emission of the observable regions of the sun.

New work at Oxford and at the Pic du Midi, together with actual experiments in Australia and South Africa, have elucidated the mechanism by which rain develops and can be induced to fall. This was referred to in a lecture in which the newest ideas on wind movements and rainfall were discussed.

The writer regrets that in consequence of his absence from England during the past summer it was impossible to arrange the hoped-for visits to industrial plants in the Bournemouth district; this, however, will receive future attention.

(Signed) HERBERT E. CLARKE,
Chairman.

Zoological

During the year fifteen lectures have been given, nearly doubling the number given in the preceding year. Of these, two were illustrated by living specimens, four by films, two by epidascope and all the rest by slides.

Among the eight field-meetings arranged, Abbotsbury Swannery was revisited, and a visit to Arne and Wareham by motor launch was much enjoyed. Members were greatly privileged in having the guidance of the President, Dr. Edward Hindle, F.R.S., on the occasion of the visit to the London Zoological Gardens.

The Section desires to express thanks and gratitude to Mr. F. Williamson for the work he has carried out in putting the zoological slides in order. Sincere appreciation has been expressed by members for the many useful and valuable books on Zoology added to the Library by the Committee.

The periodical magazine, "British Birds," continues to be circulated to members of the Reading Circle.

SUMMARY OF OBSERVATIONS.

General.

Badger (*Meles Meles*). Hazelhurst, Sway, many traces of grubbing on lawn after the night of May 1st-2nd. Some chickens taken (badger hairs found) late in the summer (E.C.). One on heathland between Canford School and Poole—Wimborne Road, August 16th (S.B.). One at Arne, September 12th (W.S.I.C.).

Red Squirrel (*Sciurus vulgaris*). One at Hinton Admiral, March 28th (H.G.S.).

Grey Squirrel (*Sciurus vulgaris leucourus*). One (m.) shot, Jan. 2nd. One (f.) shot, Jan. 4th. One in nest-box in day time, probably bred, or attempted to, Feb. 28th (E.C.).

Dormouse (*Muscardinus avellanarius*). One at Hinton Admiral, Aug. 16th (S.B.).

Wood Mouse (*Apodemus Sylvaticus*). One at Hazelhurst, Sway, Jan. 3rd. Also one on March 2nd (E.C.).

Yellow-necked Mouse (*Apodemus flavicollis*). At Hazelhurst, Sway, one (m.) Feb. 22nd. One, Feb. 24th. Both trapped (E.C.).

Brown Rat (*Rattus Norvegicus*). Present throughout the year in small numbers at Hazelhurst, Sway (E.C.).

Bank Vole, Red-backed Field Mouse (*Evotomys glareolus*). One in March and again in June, Stanpit (W.G.S.).

Short-tailed Field Vole (*Arvicola agrestis*). One in Tawny Owl's nest, at Hazelhurst, Sway, April 16th (E.C.).

Hare (*Lepus europœus*). One put up by dogs on Pennington Marshes, Jan. 5th (E.C.). One seen Burton, March 2nd, and one at Guss, April 24th (H.G.S.).

Rabbit (*Oryctolagus cuniculus*). Present in small numbers throughout the year at Hazelhurst, Sway (E.C.).

Hedgehog (*Erinaceus europœus*). One in garden at Southbourne in June (B.G.).

Mole (*Talpa europœa*). One Feb. 23rd. One March 2nd at Hazelhurst, Sway (E.C.).

Whiskered Bat (*Myotis mystacinus*). One on wall of house, March 6th, Hazelhurst, Sway. Dead in same place on March 26th. This was critically examined and the identification made certain (E.C.).

Ornithological.

The Section has had several excursions during this wonderful summer. One of the most interesting was to Leckford Abbas, organised by Mrs. Boyd Watt. Duck, geese and swans from all over the world were shown to the members by the Curator, Mr. Terry Jones. Afterwards the members enjoyed an excellent tea in the lovely house.

Members have sent in some interesting notes this year. Mr. Green was fortunate in seeing a Golden Oriole on May 19th, at East Parley.

Miss M. Penrose reports a Hen Harrier seen many times during the winter and early spring. At one time she watched it chasing eight Mallard, who just saved themselves by taking shelter on a small pond.

Common Buzzards seem to be on the increase. They were reported by Mr. Scarsdale Brown, who saw a pair at Winterbourne Stickland in June; one at Fontmell Magna, August 21st. Miss Penrose reports them in greater numbers than usual in the New Forest. Miss Popham saw five at one time circling over Amberwood, and several times saw a pair flying over Holmsley. Mr. Cohen reports two young reared in a nest in the Forest.

Hobbies have been reported several times from Fontmell Magna by Mr. Scarsdale Brown, from Ringwood; by Miss Penrose; one near Holmsley by Miss Popham; a pair, with three young, seen in Amberwood by Mrs. Mier. Miss Goodwin reports one seen July 20, a pair on August 10th, and a single one August 13th, all near Ringwood.

Other Reports.

Magpie (*Pica p. pica*). Eleven seen together at Set Thorns (E.C.).

Jays. Plentiful in the Forest (C.P.).

Hawfinch (*Coccothraustes c. coccothraustes*). Seen Bransgore (C.P.).

Greenfinch (*Chloris c. chloris*). Flock of 80-90, Jan. 26th, seen Long Slade Bottom (E.C.).

Siskin (*Carduelis spinus*). Pair settled on a bush, Nov. 17th, 1948 (M.P.).

Crossbill (*Loxia c. curvirostra*). Several reported Parkstone and Southbourne, Sept. 24th-27th (Miss Branson).

Corn Bunting (*Emberiza calandra*). None reported at all. They seem to have vanished altogether.

Yellow Hammer (*Emberiza c. citrinella*). Flock of between 35-40 seen Bransgore, April (C.P.).

Cirl Bunting (*Emberiza c. cirlais*). Nest with 3 young, Wootton, May 29th (E.C.).

Reed Bunting (*Emberiza s. schœniclus*). Fairly well distributed (E.C.). (C.P.).

Wood Larks (*Lullala a. arborea*). Apparently increasing. Seen and heard Ringwood (M.P.), Crowe Hill (V.G.), Bransgore (C.P.), Pilley Bailey and Poundhill Heath (E.C.).

Tits. Well distributed, with exception of the Willow Tit, which has not been reported.

Pied Flycatcher (*Muscicapa h. hypoleuca*). Unusually common in the Fontmell Magna area (S.B.).

Spotted Flycatcher (*Muscicapa s. striata*). Common (E.C.) (C.P.).

Dartford Warbler (*Sylvia undata dartfordiensis*). Scarce round Ringwood (M.P.). A pair probably nested near Holmsley (C.P.). Two nests reported (E.C.), Keyhaven.

Fieldfares (*Turdus pilaris*). Very large numbers seen in the Forest during the winter (M.P.) (C.P.) (E.C.).

Redwings (*Turdus m. musicus*). Also in large numbers (M.P.) (C.P.).

Whinchat (*Saxicolor rubetra*). Brockenhurst Wiers, April 16th, Downton, 4 (E.C.). Not common.

Stonechats (*Saxicolor torquata hibernans*). On the increase again (C.P.).

Black Redstart (*Phœnicurus ochrurus gibraltariensis*). Reported seen at foot of Barton Cliffs, Dec. 16th, 21st, 23rd and Jan. 3rd, 10th and 28th by E.C.

Nightingales (*Luscinia m. megarhyncha*). Plentiful, Bransgore and neighbourhood (C.P.).

Hoopoe (*Upupa c. epops*). May 31st, June 1st, heard and seen at Hazelhurst, Sway (E.C.).

Kingfisher (*Alcedo atthis ispida*). Still not very plentiful, though on the increase, Pennington, Lymington, Keyhaven (E.C.). Two seen Mudeford (C.P.). Two seen Wareham, Sept. 12th (W.B.W.).

Green Woodpecker (*Picus viridis pluvius*). Female caught at roost and colour ringed, seen Feb. three times, April three times, June twice, July six times and Aug. six times (E.C.).

Tawny Owl (*Strix aluco sylvatica*). Nest with 3 eggs (deserted later) Sway, Feb. 28th (E.C.).

Peregrine (*Falco p. peregrinus*). Fontmell Magna (S.B.), Aug. 21.

Hen Harrier (*Circus c. cyaneus*). Keyhaven Marshes, Feb. 2nd (E.C.), May 9th, near Burley (C.P.).

Heron (*Ardea c. cinerea*). Nearly always on Stanpit Marshes (C.P.).

Great Crested Grebe (*Podiceps c. cristatus*). Oxey Lake, Jan. 12th (E.C.).

Slavonian Grebe (*Podiceps auritas*). One, Oxey Lake, Jan. 12th.

Black-necked Grebe (*Podiceps n. nigrocollis*). Two, Oxey Lake, Jan. 12th (E.C.).

Stock Dove (*Columba œnas*). Hazelhurst, Sway. A natural hole in hollow ash had 5 clutches in the 1949 season, 4 certainly and all 5 probably flew safely. The young of brood 1 overlapped with eggs of brood 2 and the young of brood 3 with eggs of brood 4 (E.C.).

Turtle Dove (*Streptopelia t. turtur*). Flock of between 40-50 seen on electric light wires, near Oxford, Aug. 13th (C.P.).

Bar-tailed Godwit (*Limosa l. lapponica*). May 5th, Stanpit Marshes (C.P.).

Curlew (*Numenius a. arquata*). Possibly bred near Holmsley (C.P.)

Jack Snipe (*Lymnocryptes minimus*). Feb. 3rd, near Ringwood (M.P.).

Turnstone (*Arenaria i. interpres*). Several seen between Pennington and Lymington (E.C.).

Grey Plover (*Squatarola squatarola*). Few seen between Pennington and Lymington (E.C.).

Oyster Catcher (*Hœmatopus ostralegus occidentalis*). Nearly always some in Christchurch Harbour.

Arrival of Migrants, 1949.

Wheatear, Bournemouth, April 1st (S.B.), April 4th (C.P.).
Chiffchaff, April 8th (C.P.), April 12th (E.C.).
Sand-Martin, April 24th (C.P.).
House-Martin, April 17th (E.C.), April 19th (C.P.).
Swallow, April 4th (C.P.), April 12th (E.C.).
Swift, May 5th C.P.), May 11th (E.C.).
Willow Wren, April 4th (C.P.).
Yellow Wagtail, April 7th (C.P.).
Sedge Warbler, April 19th (C.P.).
Reed Warbler, April 24th (C.P.).
Whitethroat, April 21st (C.P.).
Cuckoo, April 12th (C.P.), April 14th (E.C.).
Turtle Dove, May 17th (C.P.).
Lesser Tern, May 1st (C.P.).
Common Tern, May 5th (C.P.).
Nightjar, May 19th (C.P.).
Wood Warbler, April 26th (C.P.).
Spotted Flycatcher, May 20th (C.P.).
Blackcap, April 14th (C.P.), April 16th (S.B.).
Nightingale, April 12th (C.P.).
Tree Pipit, April 12th (C.P.).
Grasshopper Warbler, April 24th (C.P.).
Sandwich Tern, April 4th (C.P.).

ABBREVIATIONS.

S.B. = Mr. Scarsdale Brown.
E.C. = Mr. E. Cohen.
W.S.I.C. = Mr. W. S. I. Cox.
V.G. = Miss V. Goodwin.
B.G. = Mr. B. Gorton.
C.P. = Miss C. Popham.
M.P. = Miss M. Penrose.
H.G.S. = Mr. H. G. Sadler.
W.G.S. = Mr. W. G. Smith.

(Signed) WINIFRED BOYD WATT,
Chairman.

Art Exhibition

The Art Exhibition of the B.N.S.S. was held on November 10th, 11th and 12th, 1949. The attendance was very good, exceeding if anything last year's. But the number of exhibits sent in was rather less than previously, though the standard was well maintained. Oil Paintings, Water Colours, Pen and Ink Drawings and Photographs predominated. They provided wide variety and were of excellent quality. Exhibits of Wood Carving by some members showed rare skill; and an example of Pottery work, consisting of a figure study of a peasant girl, was excellent. The number of Needlework exhibits was considerably less than previously, but those that were submitted revealed much artistic ability.

It is not usual to mention names of exhibitors, but it is perhaps not out of place to record a new feature this year, viz., the exhibition of a collections of Coins of considerable numismatic interest by V. du Bedat Smythe, F.R.M.S.

The thanks of all concerned are tendered to the Tea Committee who this year excelled themselves in quality and service.

Lantern Slides

Last year we gave a full list of the lantern slides belonging to the Society which are available for the use of members on application to the undersigned. The arrangement and cataloguing of the slides is practically complete, although there are still many slides the subjects of which have not yet been identified. During the year the following slides have been added:—British Snakes (27), by the late Mr. L. Beeching Hall; Pembrokeshire (51), by the late Mr. F. L. Lowther; Morocco (88), Switzerland (50), Geographical (45), various (75) and others not classified, from Mr. T. Ernest Waltham; Physical Geography (17) and Meteorology (24).

The Council will be pleased to accept gifts of slides, either in small or large number.

(Signed) F. WILLIAMSON.

Presidential Address

Hirundinidae and Apodidae

By Mrs. Boyd Watt, M.B.O.U., F.Z.S.

(*A Lecture delivered before the Society on November 5th,* 1949.)

The first of the two families of birds for our consideration is the Hirundinidae, which includes Swallows, House-Martins, and Sand-Martins. These in form and behaviour are unlike any other British birds except swifts. They belong to the order Passeriformes, or perching birds, their feet with three toes in front and one behind being specially adapted for perching. They spend the greater part of their lives in the air, and feed on a variety of insects, including flies, dragonflies, moths, butterflies, beetles and winged ants.

Genus Hirundo.

The Swallow is a slender bird with long pointed wings and forked tail, the outer feathers of which, known as "tail-streamers," are considerably elongated. The tail feathers are dark, glossed with green, the four outer feathers having a white patch on the inner web. The whole of the upper parts are dark glossed metallic blue, the forehead, chin and upper throat chestnut red, with a band of dark blue below. The under parts are buff shading to cream. The black bill is broad, triangular and flat with the tip slightly curved, the gape is very wide, eminently suitable for catching insects which are taken on the wing. The tarsi and feet are black, unfeatherd and very short. The female differs only slightly from the male in having shorter tail-streamers and generally paler colouring. In the young bird the streamers are shorter still. A young bird picked up dead on the Society's visit to Hengistbury Head on September 16th, showed the short outer tail feathers, with white patches on the inner web, and the colouring on forehead and throat very much reduced.

A feature of the nestling is the lemon yellow colour of the inside of the mouth and the pale flanges edging the wide gape. I have seen a row of fledglings perched on a fence and as the parent arrived with food, there was a flash of yellow, as all the young mouths were opened at once.

Breeding begins from mid-May onwards until September or even later. The habitat in the breeding season is usually open and cultivated country, near water, and round about habitations. The nest is built chiefly of mud and straw, lined with grass and feathers and usually on some kind of support such as shelves or rafters in outhouses. It is almost invariably inside a building. The birds have been known however to build on a vertical wall, without any support below, the nest open at the top and saucer-shaped, not domed like a House-Martin's nest. As a rule a second nest is built for the second brood. Nest-building is much quicker in the case of second nests, less even than half the time of the first. A probable reason for this is the fact that fewer insects are about in the early part of the year and birds spend more time in feeding—whereas later, in summer, insects are abundant.

Between the completion of the nest and the laying of the first egg there is usually an interval of four or five days which may be due to allowing time for the mud to dry before egg-laying begins. Usually four or five eggs are laid spotted with dark brown. Incubation lasts about fourteen days and fledging about twenty-one days.

Sometimes the parent birds will roost in the nest, side by side, head to tail. Young birds of the first brood will roost close to the second brood nest, or in the deserted first nest.

A nest was discovered at the end of a very dark tunnel in which it was necessary for an observer to carry a light. Nevertheless, the parent birds flew in out of brilliant sunshine and found their way easily.

The time-table of a pair of swallows which built their nest on a beam in a garden shed near Bury St. Edmonds was given by Sir William Beach Thomas, in a recent issue of the "Observer." The hen began to sit on July 28th. The four young all left the nest on September 3rd—a period of five weeks and two days. The young returned to roost in the nest until they were too big for the nest to hold them. On Sept. 27th the whole family left.

The flight of swallows is light, easy and graceful. They will glide with outstretched wings or with rapid sweep will skim low over meadows and over water with characteristic and frequent changes of direction, feeding as they go. Insects are also taken from the surface of the water, and in the upper air at considerable heights. They will sometimes sip the water as they skim the surface. Their walk is awkward and clumsy, with their short legs aided by uplifted wings. They will perch in great numbers on wires and fences and roofs of buildings.

Except in the breeding season they are gregarious and great gatherings may be seen preparatory to the Autumn migration when at roosting time they assemble in reeds and osier beds. They sing as they fly, uttering a soft low warbling twitter, with a loud high note when alarmed.

Except in the extreme North, the breeding range is fairly general all over Europe, as far South as Northern Africa, and eastwards as far as Arabia, Persia and India. The Spring Immigration usually begins towards the end of March and continues right on to the end of May. The Return Emigration begins about the first week in August and continues on into October. My latest record of departing swallows is of a party of twelve suddenly appearing round my home in Hampstead, North London, on November 9th. They circled in rapid flight for a few minutes, apparently feeding, and then went off in a southerly direction. But a later date than this has been known, for in the Autumn of 1880, a year remarkable for the prolonged stay of the Hirundinidae, a swallow was reported by Mr. William Eagle Clark as having been seen at Bournemouth on Dec. 7th.

Swallows travel far to winter in South Africa. It is worthy of note that birds of British origin are found almost without exception in the Eastern half of South Africa, whereas those of German origin are found in Western Africa within ten degrees of the Equator.

It is recorded in the Magazine "British Birds" that a swallow was caught in a farmhouse in Natal on December 23rd, 1912, with a metal label round its leg inscribed "Witherby,, Holborn, London," and the number B.830. The farmer took the label off and a letter was sent to Mr. Witherby, who looked up the ringing records and found that a swallow nesting in the porch of a house in Cheadle, Staffordshire, had been ringed with B.830 on May 16th, 1911, thus proving that the bird had taken the long journey from Western Europe to the South-east of Africa, covering thousands of miles. Another swallow ringed on the same date in the same porch returned there the next year to nest again. There are no records of swallows marked as adults being recovered elsewhere in the breeding season than at the same place and invariably at the same nest. Sometimes even the same pair keep together for a second breeding season. Birds of the first year very seldom return to the exact spot where they were hatched, but usually to the same neighbourhood.

The average annual mortality of the swallow given in "British Birds," May 1949, is 63 per cent., a high figure representing only thirty-seven survivors out of every hundred. The expectation of life on the first day of the first January of life is estimated at 1.1 years. These figures have been determined by recoveries of ringed birds and run extremely close to those of Robin and Redstart. They are the lowest figures for average adult survival known for any species of bird. By far the oldest bird recorded was that ringed as a nestling in 1911 in Ross-shire and recovered nine years later in 1920, near Glasgow—it was killed by a cat. Bird rings are now marked "British Museum Natural History" with a number. In 1948 a total of 1,239 swallows were ringed.

The disastrous mortality of swallows in Central Europe in the second half of September 1931, is recorded in the Journal of Animal Ecology, May 1933. There was a cyclone over Poland, which resulted in a sudden cold spell over Southern Germany, Austria and Hungary. Snow fell on the mountains and cold rain in the Danube Valley. Immense numbers of swallows, House-Martins and some Sand-Martins, numbed by cold and unable to find food, sought shelter in stables, barns and houses, where they congregated in great masses, and were so inert that they could be picked up by hand. In Austria the public were invited to send them to the Vienna Zoological Gardens, where they were placed in a warm building and supplied with mealworms. About 89,000 were transported thence by aeroplane and train to Venice, where they were liberated. About 450 birds collected in Hungary, were forwarded by train from Budapest to Constantinople. It is probable that the 90,000 individual birds rescued at Vienna and Budapest were only a small fraction of the total. Now once again our birds have left us. In the words of a bird lover, "we are deprived for another six months of one of the loveliest of sights,—a swallow dividing the sunny air."

Genus Martula.

The House-Martin and Swallow have many characteristics in common, but there are some outstanding differences. Perhaps the most striking distinction is the conspicuous white rump, very noticeable in flight. The tail is far less deeply forked than that of the swallow, and the entire underparts are pure white, making a vivid contrast with the blue-black of the upper parts. The tarsi and feet are densely covered with white feathers down to the claws, conspicuous when on the ground or clinging to the nest. In the young bird the upper parts are brown with very dark wings and tail. The sexes are alike. The flight is less graceful than the swallows, more erratic and not so rapid, though sometimes reaching to greater heights. The bird is more sociable than the swallow and very gregarious at all times. As its name implies, it builds under eaves of houses rather than in sheds, and the nests are often so close as to be actually in contact. They are built of mud, strengthened with grass, and without any support below. Pellets of mud are dabbed on the wall, and added to in successive layers until the nest is built, shaped like the section of a cup and slightly domed. In a dry season, when ponds and ditches dry up, birds may have to fly long distances to find sufficient mud. Nearness to a river attracts the House-Martins. On a walk near the River Stour from Throop Mill to Merrietown, I once counted over a hundred nests, some packed closely together. The four or five eggs are glossy white. When the young are hatched, the parent birds can be seen hawking for insects and flying up to the nests to feed the young ones who soon learn to peer out expectantly over the rim. The birds are double brooded—three broods have been known to occur.

After the young are fledged, both parents and young continue to roost in and near the nest until migration and are practically never found like swallows and sand-martins in vast numbers in reed beds.

From time to time fresh information is recorded as opportunities occur. In "British Birds," March 1949, it is recorded by an observer while on guard at the North Airfield, Cranwell, Lincolnshire, that he saw a large party of House-Martins feeding on small moths at 2 a.m. on July 2nd, 1948. It was so very dark at the time that he could only see the birds within a few feet of where he was.

Genus Riparia.

We now turn to the Sand-Martin which is the third and last of this family to be considered. The bird has an individuality of form and behaviour in contrast to the first two. In size it is smaller. In colouring the upper parts are brown, with darker wings and tail, the under parts white with a brown band across the chest. The white of the chin and throat is carried round the sides of the neck, below the ears. Except for some short feathers at the back of the tarsus, the dark feet and legs are bare. Like the House-Martin, the Sand-Martin is very gregarious.

The nature of its breeding habitat in cliffs and sandbanks allows of its nesting in large colonies. It bores out a tunnel of two or three feet in the sand, at the end of which is the nesting chamber, lined with grass and feathers. Four or five eggs are laid, white but not glossy. Many of these nesting sites have been in continuous use for many years.

Sand-Martins are known to arrive in Spring Migration a little in advance of the Swallow, in early March. On reaching the nesting site, a bird will settle on the cliff-face, peck at the sand until a firm foot-hold is secured, then, by a winnowing movement of shuffling and scratching with the carpal joint of each wing alternatively, a ledge is produced. This is enlarged and the tunnel commenced. The size of the entrance is usually the width of two birds with room for a turn round and emergence head first. Birds have been seen to pass one another in the entrances. As tunnelling proceeds, the shuffling out of the sand by the feet continues, apparently by being worked steadily backwards and eventually thrown out. Shorter tunnels are found in firmer sand. The holes at Rothley Sand Pits, Leicester, tended to follow the lines of the glacial sand deposits and were often in double rows. The birds appear to sense the proximity of adjacent burrows, for at this site, although nest cavities were very close, in no instance was a merged cavity found. In some burrows there were deviations to right or left. To the observers at this site the question arose as to how the birds prevented loose sand from falling into the nest. Tunnels were carefully examined and it was found that the roofs felt hard, had a corrugated surface, and in some instances were slightly damp. Considerable activity prevailed along the face of the cliff, with birds coming and going, those arriving with a feather being chased by others, and there was a struggle for possession.

Then suddenly, as at a given signal, the whole colony would rise high into the air, rapidly pass out of sight and return as suddenly as they had departed. It was considered that the breeding cycle covered two weeks excavation and laying, two weeks incubation, and three to four weeks fledging and developing in the nest. As soon as the young could reach the entrance and ledges, they were fed there, being summoned by a call from the parents. They were found to be very quick at retreating backwards into the holes to give place to the rest of the family in turn. A young one taken from the nest and placed on the ground was seen to walk backwards.

Members of this family suffer considerably from parasites. Almost every nest at this site abounded with Microglossa pulla, a small black beetle of the cockroach family which apparently did no harm to the birds. One species of flea, Ceratop syllus styx, though harmless to humans, were definitely parasitic on the birds. The third insect was a tick, Ixodes erinaceous, a quarter of an inch in diameter, with a saw-edged proboscis, which, buried in the flesh of the bird, made it very difficult to remove. These drew blood and had an obvious harmful effect on the bird, which they appeared to leave when satiated.

When the young were fully fledged some that remained in the nest, apparently reluctant to leave, were seized by the parents at the back of the neck and carried out into mid-air before being released. It was observed that they all managed to fly. The number of breeding pairs at this site were estimated at 190 pairs.

The last week in April 1947 was the occasion of a severe cold spell when many birds were found dead and dying in the holes from the effect of the intense cold and starvation. In one hole twenty-one birds had sought refuge. Another cause of mortality at this site was the activities of sparrowhawks which for a time played havoc at the nests. Cliff falls, when masses of sand become dislodged, are another cause of high mortality.

Instances of re-occupation of nests after use include a toad found in one, a short-tailed field vole in another and a wasp's nest in a third. I have seen nests where sparrows have taken possession, their untidy litter hanging out of the holes and the rightful owners ejected. At Hampstead I found a kingfisher in possession of one of the nests.

The flight of the Sand-Martin is fluttering and erratic, not unlike that of a bat. Its twittering song is rather harsh.

Sand-Martins, like Swallows, will congregate in immense numbers before and after migration, roosting in reed-beds and osiers. Mr. J. C. Follett records the roosting of large numbers of Sand-Martins in the reed-beds around Littlesea at the end of August this year. They participated in massed flights before settling down for the night.

The Sand-Martin is more widely distributed than the Swallow and House-Martin, being known in the areas recorded for the two latter, and in North and South America.

This concludes our consideration of the Hirundinidae and we now turn to the Family Apodidae, which includes the Swift.

Genus Apus.

The Swift belongs to the Order Apodiformes, a distinguishing character being the feet with four toes all directed forwards, enabling the bird to cling to wall ledges and rocky cliffs.

The Swift has been compared with Swallows and Martins as the only birds to which it has any resemblance. There is in them all the same slender build, long wings and forked tails, rapid aerial flight and the capture of insects for food while on the wing. But the Swift is distinguished, however, not only by all of its toes being directed forwards, but in the backward sweep of the long scimitar shaped wings and in its uniform sooty brown plumage relieved only by the whitish throat. As a child I knew it as the "bow and arrow" bird, which gives a fair description of its appearance in flight.

The tail is short and forked, the black bill very flat and broad at the base, with the tip of the upper mandible curved. The gape is extremely wide, the mouth opening nearly as far back as the forward edge of the eye. The feet are black, the tarsi short and strong, with the frontal part feathered but bare at the back. It is a pre-eminently aerial bird with almost phenomenal powers of flight, said to be exceeded among British Birds only by the Hobby. Though it exceeds the Swallow in speed it is far less graceful.

It nests chiefly in towns under eaves of houses. Its nest is built up of a mixture of grasses, feathers, straw, glued together with a sticky salive to form a cup. Two or three eggs are laid, white but not glossy. Breeding begins about the end of May or beginning of June. Incubation lasts about three weeks and fledging for six weeks. The bird is single-brooded. Parties of birds will wheel in rapid flight around breeding places, screaming harshly as they dash past, with answering screams from the sitting birds. The distribution abroad is very much the same as the Swallows—but in migration the Swift is late to arrive, usually at the end of April, and among the first to leave in the Autumn.

It has been said that Swifts spend the night on the wing. This, however, has not been proved. It has been certainly known to roost under eaves of houses. During the breeding season both sexes roost at night in the nest.

The Swift is practically unable to walk and can only shuffle along the ground, from which it rises by an uplift of the wings followed by a sharp downward movement. It will easily launch itself into the air from a ledge.

The bird is a main subject of research by the British Trust for Ornithology, at the Edward Grey Institute, Oxford, where they have them nesting in glass-backed boxes for observation, but none of this work has yet been published.

In conclusion, I wish to acknowledge with gratitude my indebtedness to " British Birds " Magazine, the British Trust for Ornithology, the Leicestershire and Rutland Ornithological Society, the Royal Society for the Protection of Birds, and to W. B. Alexander, M.A., P. E. Brown, M.B.O.U., David Lack, M.A., Sc.D., Miss E. P. Leach, M.B.O.U., and R. Storer, B.Sc.

Blashenwell Tufa

By HENRY BURY, M.A., F.G.S., F.L.S.

This tufa, which lies to the south of Corfe Castle, and has a superficial resemblance to chalk, extends for about 600 yards to the north-east of Blashenwell Farm, and covers about 20 acres of land. It was 8ft. thick close to the western margin of the deposit, and was therefore probably more in the centre, where it has not been explored. It occupies a shallow valley eroded in the Wealden beds, presumably in the Pleistocene, and there is a small stream running through it, which rises in the Purbeck strata behind the farm, and eventually joins the Corfe River.

On the 6in. map of the Ordnance Survey (Dorset sheet LVI N.W. Edtion 1929) two pits are shown where the tufa has been dug out for marling the land—a large pit 250 yards north of the farm, and a small one near the northern limit of the deposit. The large pit is divided by the road into two parts, east and west, which are now about 60 yards apart.

An excellent account of this tufa was given by Clement Reid in 1895 (Proc. Dorset Field Club, Vol. xvii, 1895, pp. 67-75). He worked in the large pit, close to the western margin of the tufa, where he found a most interesting "kitchen midden" containing microlithic flint chips and charcoal, as well as bones of animals, and shells of marine molluscs, which had evidently served as food. The black surface-soil at this point contains Roman remains, but the underlying tufa (8ft. thick) Reid divides into three layers: (1) hard tufa; (2) granular tufa; (3) loamy or marly tufa; all of which contained flint chips and charcoal. Between 1938-42 I paid several visits to this pit, and collected samples, but no extensive digging was attempted, and only 5ft. of tufa was exposed above the floor of the pit, below which there was so much disturbance by rabbits that clean samples were rarely obtainable. Reid's "hard" layer, which, when I was there, occupied only a very small area on the western side, was never more than a few inches thick, and was much broken up: it was far more crystalline than the layers below, and the surface was sometimes botryoidal, while concentric rings of stalagmitic calcite were frequent, surrounding holes which had evidently been occupied by sticks. It is clear that trees, the leaves of which are sometimes impressed on the tufa, must have overhung the deposit at this corner, and the drip from them seems to have splashed it up, and so led to this formation. There was no trace of stalagmitic structure below this "hard" layer, so presumably this overhang of the trees only occurred at the end of the tufa formation. It is possible too that the drip may have caused some changes after deposition had ceased over the area as a whole.

The "granular" tufa, down to about 4ft. from its surface, I found distinctly hard; but below that level it was usually, but not always, soft, and more prolific in shells; there was, however, seldom any visible distinction, and the surface of this softer layer was very irregular. Whether it was Reid's "loamy tufa" I cannot say, as he gives no measurements, and I was unable to explore within three feet of the bottom.

Shells of land snails were fairly plentiful throughout, and in the west pit I obtained one or two limpets, a single flint flake (with no secondary work), and a few small fragments of charcoal, not well enough preserved to be determinable.

Although my samples came about equally from the east and west parts of the pit, no important differences were noticeable. Ena montana, Acme lineata, and Vortex lapicida, found only on the west, show the influence of the wood; while the greater frequency of Limnaea truncatula on the east may indicate the proximity of water, as does the single specimen of Planorbis leucostoma. It will be seen from my list that several species have been added since Reid's day, while the names have been much altered, and my experience of relative frequencies differs from his.

All the species are living at the present day, but Acme lineata is a rather recent addition to the Dorset fauna; while Ena montana and Vertigo pusilla are not known in that county.

The following is a list of the shells found by me in the large pit. They were kindly identified for me by Mr. A. S. Kennard, who gave me all possible assistance.

List of Shells from the Blashenwell Tufa (large pit).

Pomatias elegans	25
Acme lineata	19
Carychium tridentatum	1695
Lymnaea truncatula	47
Aplecta hypnorum	3
Planorbis leucostoma	1
Vertigo antivertigo	10
,, pygmaea	25
,, substriata	1
,, pusilla	21
Lauria cylindracea	24
Clumella edentula	11
Vallonia costata	108
,, excentrica	6
Acanthinula aculeata	85
Caeciloides acicula	25
Zua lubrica	507
Ena montana	1
Punctum pygmaeum	41
Goniodiscus rotundatus	394
Clausilia rugosa	50
Marpessa laminata	10
Oxychilus cellarius	55
Ashfordia granulata	180
Trochulus hispidus	115
Zonitoides nitidus	4
Retinella nitidula	201
,, pura	40
,, radiatula	3
Vortex lapicida	1
Arianta arbustorum	5
Cepaea nemoralis	44
,, hortensis	41
Petasina fulva	11
Vitraea crystallina	293
Vitrina pellucida	1

A few words must be said about the northern end of the tufa area, which is unfortunately almost unexplored. Although the Ordnance Survey map only marks one marl pit, I found the remains of three small ones, all so overgrown that a sample was obtained with difficulty; it was about 100 yards from the northern limit, six feet away from the present stream, and three to four feet above it. This sample was remarkable for the abundance of Limnaea truncatula, and the presence of seven specimens of the aquatic bivalve, Pisidium cinereum; there was also one shell of Zonitoides excavatus, which usually avoids limestones, though perhaps, as Mr. Kennard suggested, this is more on account of the dryness of such soils than of any dislike of lime. At a much earlier period several aquatic species had been recorded by Mansell Pleydell (Proc. Dorset Field Club Vol. vii, p. 113), but as he found flint chips and marine shells, he was presumably working in Reid's "kitchen midden," where no such species have been seen seen since. My specimens are definite proof of water, but only perhaps towards the end of the tufa-making period.

Age and Origin of the Tufa. The age of this tufa is fixed within fairly narrow limits by the Mesolithic implements, the leaves of hazel, elm and oak found by Reid, and the absence of Neolithic pottery; all of which seem to point to a date between 7000 and 4000 B.C.

Reid speaks of remnants of the feasts of Mesolithic men (regarded as Neolithic in his time) as having been "thrown into the stream"; but from the nature of the fauna it seems most unlikely that there was any standing or running water at this point; for out of over 4,000 shells collected by me, only a single one (Planorbis leucostoma) belonged to a truly aquatic species; for Limnaea truncatula spends more time out of water than in it (A. E. Ellis, "British Snails" 1926, p. 101); and even this species was uncommon in the western side of the pit. Suggestions will be made directly as to how this tufa may have been deposited as a sort of marshy delta, starting at the base of the Purbeck Beds (from which all the calcareous matter was derived) and growing out in a north-easterly direction, as well as expanding laterally so as to fill up the valley previously cut in the Wealden Beds; but the real difficulty lies in explaining why deposition only began in the Mesolithic and has never been renewed.

Clement Reid (op. cit. p. 68) connects the cessation of deposition with the destruction of the neighbouring forests, but he attributes this destruction to Celic times (op. cit. p. 73) which is far too late.

Jackson (Lanc. and Cheshire Naturalist, Vol. XIV, pp. 147-158) thinks that the tufa of Caerwys is due to the subsidence of the land in early Holocene times, but seeing that this subsidence (or rise in sea-level) began very early (earlier than the Mesolithic?) and continued to at least the end of Neolithic times (Antiquity Vol. I, No. 1, pp. 10-11) it does not account for the Blashenwell phenomena. Jackson believes too that the tufa belonged to "a genial period, with a heavy rainfall." Kennard (Proc. Prehist. Soc., New Series, Vol. IV, 1938, p. 334) also thinks that deposition began at Blashenwell when the rainfall was very heavy, and the water-table stood higher than at present. But mere increase of rainfall would not lead to precipitation of lime, on the contrary, it would more probably increase the erosion which had already been proceeding for a long period; and the terrestrial fauna is against very wet conditions.

It is suggested that tufa-formation more probably began when the temperature was high and the rainfall low. Precipitation of lime might then be rapid enough to keep on blocking the channels, and compel the water to spread out on either side, so that a marshy delta would be formed, which, although small at first, would gradually grow northwards. As it increased in length and breadth, it would be able to meet an increase of rain, by distributing the water over a wider surface, without any stream being formed; but whether the final cessation was due to a reduction of temperature, or to too great an increase in the water supply (or both) is not apparent; but in either event the stream would be re-established, and the marsh would be gradually drained.

From Brookes' account (Quart. Journ. Meteor. Soc. Vol. LX, 1934, pp. 377-396) it seems possible that the warm and dry conditions here postulated may have occurred towards the end of the Boreal Period, which would agree with the botanical evidence (Goodwin. Proc. Geol. Assoc. LII, 1941, p. 334). It is well, however, to remember that the evidence so far obtained comes from a pit about 250 yards from the spring, and therefore does not mark the earliest period of tufa-formation; while the only botanical impressions so far described come from the uppermost layer of the tufa; so until some charcoal from lower levels has been identified, we cannot tell what the vegetation was at earlier stages.

When once the stream was re-established it seems unlikely that any subsequent period would provide the necessary conditions of heat and dryness for a renewal of deposition on a large scale.

A Tour of the Terraces of the Avon and Stour.

By J. F. N. GREEN, B.A., F.G.S.

The remarkable series of terraces near Bournemouth has been studied by, amongst others, Prestwich, Clement Reid, Bury, Osborne White and the writer. Inevitably they have had to be dealt with broadly and it is not easy to examine or verify them satisfactorily, merely by using the published material, without an inordinate expenditure of time. A tour, designed to show as much as possible in a short compass, was carried out in August, 1949,and the following account of it is intended as a guide to others who may be interested. The distance covered is about 40 miles along good roads. Walking distance is less than a mile if a car is used and practically nothing with a bicycle.

The terraces belong to three rivers which converged near Bournemouth. The Avon, the Stour, and the ancient Solent river, which originally combined the waters of the Frome and Trent to flow between the Isle of Wight and the mainland, but was breached and largely destroyed perhaps 100,000 years ago. The later terraces are also found in the small streams, including the Bourne and the Moors river.

The terraces to be seen are, in order of age:—

The Sicilian or 100-metre. A marine platform corresponding to a sea-level about 330 feet above the present. Later terraces are all fluviatile.
The Harefield terrace, graded to a sea-level about 230 feet.
The Ambersham or 200ft. terrace.
The Sleight or 170ft. terrace.
The Boyn Hill or 130ft. terrace.
The Iver or 100ft. terrace.
The First Taplow or 50ft. terrace.

All the above joined the ancient Solent river. Those following went direct to the sea at Poole Bay or perhaps in certain cases to a river occupying the Channel.

The Second Taplow or 50ft. terrace.
The Staverton terrace, related to a sea-level about 20 feet above the present.
The Upper Buried Channel, related to a sea-level perhaps 50 feet *below* the present. This will not be seen on the tour.
The Muscliff terrace, a delta at about 40 feet above sea-level, burying much of the Staverton.
The Christchurch terrace, related to a sea-level about 16 feet above the present.
The "Plunge," related to a sea-level far below the present.

As will be seen, parts (in the Upper Buried Channel and the Plunge, the whole) of the terraces are identical with the floodplains of the rivers. Parts higher than the floodplains are termed "elevated terraces."

The coach started from the Square and ascended the side of the Bourne Valley to the Lansdowne, from which it travelled on the Holdenhurst Road for a mile and a half along a joint terrace of the Stour and Solent at a height averaging 130 feet above sea-level. The gravels of this terrace, which is correlated with the Boyn Hill terrace of the Thames, are the chief repository of the numerous palaeolithic implements of the neighbourhood, classed as Middle Acheul. Near Queen's Park Golf Course a gentle descent brought us on to a slightly lower terrace, here about 95 feet above sea-level, which is correlated with a terrace of the Thames known as the 100-foot, Iver or Lynch Hill terrace, on which we ran for a third of a mile. Near the junction of Queen's Park Avenue with the Holdenhurst Road came a sharper descent to about 40 feet, the Muscliff terrace, on which the road continued for a quarter of a mile.

Turning north-west into Castle Lane, a halt was made, looking along Queen's Park valley. The terrace tops of Haddon Hill and Littledown, both Iver, were bounded by slopes that appeared to plunge under the floor of the Queen's Park valley and under the wide expanse of flat country seen to the north. Both the floor and the flat belong to a delta which has filled valleys formerly descending far below the present level. From a boring about two miles eastward it is known that the bottom of the buried valley is there 15 feet below present mean sea-level.

The difference between the two types of terrace visible was then explained. Those at 130 and 100 feet were normal river terraces which, until near the mouth, sloped seawards. They were once floodplains of the river concerned, left high and dry when the sea fell to a lower level and the river began to cut back. The gravel on them was deposited at the inner edge of meanders (river loops) moving down stream, and was usually only 8 to 12 feet thick, covered originally with a bed of fine mud, laid down in time of flood. If, however, the sea rose and drowned a valley, the gravel brought along by the river was dropped at the head of the drowning and gradually advanced as a delta in a series of sloping sheets,the vertical thickness of which was only limited by the depth of water available. In this delta, the surface of which was now near 40 feet above the sea, the thickness of gravel certainly went up to 50 feet.

Recent work by Mr. Calkin had identified a number of sharp unrolled implements associated with the delta gravels. They are of Early Aurignacian type. The rise of sea-level which led to the formation of the delta took place between two cold periods with marked lowering of the Ocean, which correspond to the episodes known on the continent as Wurm I and II. The rise may be presumed to be due to the melting of polar ice.

The party then drove on the delta for two miles along Castle Lane, its flat surface stretching away on the right; on the left the bluff, 80 feet high, to the Boyn Hill terrace. Turning sharp right past the little hamlet of Muscliff, from which the delta has been named, Berry Hill is approached along a mile of level country. As the Stour now flows on the other side of Berry Hill, and it must once have followed the buried channel on the Muscliff side, it evidently changed its course, while wandering about the delta surface. This accounts for the unusually perfect and level surface, 41 feet above mean sea-level, near Muscliff.

It was explained that the flat top of Berry Hill, 13 feet above the delta, was part of the lower of a pair of river terraces, both graded to a sea-level 50 feet above the present. They correspond to the Taplow terrace of the Thames. The reason why the terrace here was twofold was that the higher (First Taplow) was related to the Solent river, when it flowed via Spithead; the lower (Second Taplow) to Poole Bay after the sea broke into the Solent river valley between the Needles and Old Harry, thus dropping the river level. The actual difference here is 18 feet.

The next stop was at Throop Mill. Here was seen immediately below the weir an illustration of river action in meanders. At the outer edge of the bend the bank was undercut; on the inner edge a sloping mass of gravel was deposited. The chief interest of the mill was its situation not far from the mouth of the river. It is often said that the lowest part of a river is the flattest, whereas actually in Southern England and perhaps everywhere, there is a steep part near the mouth. The steepest place has been accurately measured in the Test, where it slopes about one in 600. It seems to be somewhat less in the Stour and Avon, the top of the plunge being at Longham and Watton's Ford respectively. Mills are preferably sited in steep parts of rivers, because a sufficient head of water can be obtained without flooding great areas of valuable land. Throop mill on the Stour corresponds to Nursling mill on the Test. The head at Throop is perhaps 4 to 5 feet and the original millpond may have been between a quarter and half a mile long. (The writer has no good figures at present.) In the course of time the whole millpond has become silted up, making beautiful meadows. Mr. Williamson informed the party that the mill is recorded in Domesday Book.

Between the plunge and the Muscliff delta is a river terrace eroded in the delta, which appears to be graded to a sea-level about 16 feet above the present. It has been termed the Christchurch terrace because much of Christchurch is built on it. Particular attention is directed to it because we are going to see its birth as an elevated terrace. Much of Hurn Park is situated on it, but it is there obscured by trees. It can, however, be seen on the right as we go down the road to Holdenhurst and we run on it for 300 yards by Holdenhurst Manor House. After crossing Iford Bridge we get on it again for a quarter of a mile along Grove Road. Turning along the Hurn road we run up on to the Muscliff delta west of St. Catherine's Hill, past a small pit from which some of the best palaeoliths are believed to have come.

At a little more than a mile beyond Hurn Bridge cross-roads it can be seen on the Ringwood road that the Muscliff terrace extends unbroken from the Moors to the Avon, so that the Moors river must at one time have joined the Avon, not as to-day the Stour.

About half a mile further the road slopes to the side of a long, very flat field, which in half a mile imperceptibly rises from 63 O.D. in the south to 68 O.D. in the north. This is part of the second Taplow terrace of the Avon. Looking west a fragment of the First Taplow is seen at 80 feet. North-west the spur of Foxbury Hill, crowned with tumuli, is part of the Boyn Hill terrace near 135 feet. At that time the Avon flowed in a big bend round the higher ground of Matchams. When the river broke through east of Matchams along its present course in Taplow time, the Moors river may have followed it.

Two miles farther on the party alighted at the point where the rough road to Watton's Ford begins and walked a quarter of a mile to the river Avon. Attention was called to a fence and ditch bounding the ground of a cottage. Seventy yards south of this an excellent standpoint is close to a gate. Here the river is 80 yards across.

The road to the ford from the east enters the opposite side of the river about 150 yards below the standpoint. The route then follows up the shallows on the other side of the river to a point about 20 yards beyond, i.e., north of the fence and ditch, crosses the river and then turns back for some 80 yards downstream before climbing on to the bank. This extraordinary course can only be explained by a movement of the ford upstream. The Ordnance map, surveyed in 1869-70, showed the crossing a considerable way on the hither, south side of the fence and ditch. Thus the ford has moved some 30 or 40 yards in 80 years.

In Roman times the floodplain was wooded and it may be assumed that the local tribal government was charged with the duty of maintaining the track. After Roman local government broke down, the natives would use the old track to the neighbourhood of the river and then diverge to follow the wandering ford. On this assumption the ford has moved about 340 yards in some 1,500 years. It has, however, probably moved more quickly, since the river and floodplain came under control, than in early times; and indeed has moved some yards this year owing to the use of a bulldozer to clear weeds, etc. The best authenicated case of a moving ford was determined by Mr. Bromehead on the River Wharfe as 200 yards in 1,500 years (Rep. Brit. Assoc. 1932, App. p. 13).

An old route by the standpoint is obvious, with a drainage ditch, now derelict, along its side. This may have been at the crossing between 200 and 300 years ago.

Facing the standpoint, the field on the other side of the river is seen to be lowlying with a marshy tendency. This is the floodplain; in flood time it is covered with water as far as a green bank which can be seen beyond it. South of the standpoint, on the other side of the derelict drain, is a broad field, which lies about two feet higher than the floodplain. This is part of the elevated Christchurch terrace. Two and a half miles direct downstream, near the causeway, this terrace is six feet above the floodplain; in another two miles, near Burton, it is ten feet above the floodplain; and at Christchurch it is about 15 feet above it.

It was explained that a "nick" is a place in the river course where the slope of the stream increases, with a consequent increase in stream velocity. As a rule, in our southern rivers, a nick marks the position to which lowering of a river, caused by a fall in sea-level, has worked upstream. The nick at Watton's Ford indicates how far the steep "Plunge" has worked back into the Christchurch terrace; and here is born the elevated terrace.

The floodplain is covered by gravel, usually about 8 feet thick, with a capping of mud. This gravel holds much water, the level of which, near a nick, is lowered, so that it seeps into any depression and thus tends to wash the gravel away and to make channels. Such channels often unite and enclose portions of the old floodplain, thus creating "eyots" or "aits." Looking upstream from the standpoint, there is a typical eyot about 250 yards away, the river flowing on both sides of it.

The Christchurch terrace coincides with the floodplain to a little above Ringwood. The name Blashford commemorates a ford at the nick there.

Now turn to higher terraces. The green bank, against which the floodplain ends on the opposite side of the river, is the edge of a terrace 6 to 7 feet higher. This is the terrace which was seen at Muscliff, the "Muscliff delta," and is at the same height, 41 feet O.D. Actually there is a strip of it by the standpoint, but it is partly worn down to 37 or 38 feet by the combined efforts of rabbits and wind. Looking south-west the skyline of the Boyn Hill or 130ft. terrace is seen. To the south the top of St. Catherine's Hill, averaging 170 feet, shows a very distinct flat. This is the Sleight terrace, first named and followed for a considerable distance by Mr. Bury. It can also be seen close by in a westward direction, but the gravel has recently been dug from the small portion of flat preserved.

Looking east and north-east a long wooded ridge forms the distant skyline. This is the Sicilian or 100-metre platform, usually between 300 and 340 feet. It is known at the same level across France and Italy at least as far as Egypt. It was first identified in this country by Mr. Bury, who showed from its contours that it must be of marine origin. This was 27 years ago and it should be on record that in this case, as in earlier papers, Bury was upholding the classical British geologists, who attached importance to marine action, against the influence, then overwhelming, of the American school, which ascribed such flats to subaerial action. The great value of his work is now, somewhat belatedly, being recognised (e.g. Prof. Wooldridge, The Advancement of Science, VI, 1949, No. 21, p. 5).

After leaving Watton's Ford the route continues north for a mile on dissected fragments of the Boyn Hill and then descends to the First Taplow before turning into the Ringwood-Poole road. The next stop is at St. Leonard's Bridge, which crosses the Moors river at the head of the Muscliff delta. Looking back the road rises 16 feet to the Second Taplow; to the south-east and also ahead can be seen a somewhat elusive terrace, the Staverton, here about 10 feet above the river. This terrace lies between the Taplow and Muscliff terraces, but is graded to a lower level, so that much of it is hidden under the delta.

At Trickett's Cross we run up on the First Taplow again, on which the road runs for most of the next two miles. At Holmwood it descends to the Muscliff delta of the Stour and keeps on it to Longham. To the west the Staverton terrace is seen rising about 5 feet above the delta. Eighty yards before reaching the bank of the Stour a footpath runs east to Dudsbury along the floodplain, which here belongs to the "Plunge" below the nick to the Christchurch terrace. Walking along it for 150 yards to the vicinity of a stile, the little bluff, about two feet high, is seen to the left and also across the river. Looking along a hedge on the other side of the Stour, we see on the left the bluff to the Muscliff terrace with Kinson Farm; on the right the Staverton terrace, only three feet higher.

Returning to the road, Longham Bridge is seen to be partly on an eyot. The Christchurch terrace coincides with the floodplain up to Canford, which corresponds to Blashford on the Avon. The route from Longham runs on it most of the way to Bear Cross; here after turning west the road is mostly on or near the First Taplow, but south of Wimborne lies for nearly a mile on the Boyn Hill, the Higher Merley terrace of White. It then crosses a little valley and a railway, after which it enters a curious depression in the Sleight terrace, which continues for three-quarters of a mile. Turning right at Cogdean Elms for a quarter of a mile, the party alighted and walked along a rough road to a causeway carrying a path across a large worked-out pit, the "Ballast Hole," above a railway cutting.

From this causeway, which is at a height of about 185 feet, we look down northward to the well-marked terrace of Lamb's Green, mostly from 125 to 130 feet, equivalent of the Iver or 100ft. terrace. Above is the Sleight terrace, here at 205 feet. The slope between is quite continuous, without a trace of the intermediate Boyn Hill. But to the north, across the Stour, a mile and a half away, the Boyn Hill of Pamphill is plain, there over half a mile wide. It is clear, then, that in those days the river ran in a wide meander viâ Pamphill with a spur of the Sleight terrace projecting at least a mile northward. This spur was destroyed when the swinging meanders of the 100ft. stream laid down the gravels of Lamb's Green.

The gravels of the Sleight terrace which, as seen in the continuation of the pit into them and also in the Sleight pit, were 9 to 12 feet thick, began, when the bluff was established, to move down it. As far as the writer knows there is no account in the English language of the mode of this motion. It has, however, been investigated by a German, W. Penck (Morphologische Analyse, 1924, Chap. IV), with whose results the writer's experience agrees. According to Penck surface rubble, moving down a slope, tends to aggregate into streams, which become fewer and more marked as the depth of the bluff increases. Such channels are well seen in a railway cutting in the Corfe Hills, mentioned later; but one, somewhat obscured by vegetation, can be observed in the cutting below the causeway. It is noticeable that this gravel-filled channel stands up as a "hump" above the local sands, evidently because the latter are more readily eroded by rain during a genial period. The gravel movement was by way of "solifluction" in a colder climate.

At the Ballast Hole and several other pits in the neighbourhood the sludged gravel is underlain by fine-grained material, notably a white silt, torn up and fragmented. This silt is believed to have been formed during a genial period, when the bluff was covered by vegetation, and to be composed of washed-down wormcasts. Near the base of the gravel at the Ballast Hole, sometimes associated with the white silt, a large number of sharp palaeoliths of Middle Acheulian type have been obtained, especially about 10 feet below the base of the Sleight terrace. The upper part of the gravel was intensely channelled and contained palaeoliths of Later Acheulian type.

Returning to Cogdean, there are remains of a pit dug in the depression. This lies at or near the base of the bluff to the Ambersham (or Winter Hill) terrace, which can be seen to the south at an elevation of 238-240 feet. The road west from Cogdean, as far as the Poole road, is close to the depression, which must have marked the line of a rivulet which, when the Boyn Hill floodplain was at Pamphill, drained into the Stour near Merley. Records show that the little valley was about 25 feet deep, but it has largely been filled up by soilcreep. From Cogdean pit a remarkable series of late Acheulian palaeoliths, in mint condition, was obtained. They probably descended into the little valley from a nearby camping site. Our knowledge of them is mostly due to Mr. Calkin.

The Sleight pit opens at the west end of the depression. Except near the entrance the whole pit is excavated in Sleight terrace-gravel, either in situ or lowered and somewhat disturbed by subgravel erosion. This form of erosion, which is often overlooked, may be observed in the Bournemouth cliffs; at many points water comes out below the gravel capping, and cuts runnels in the underlying sand.

The road to Bournemouth from Sleight rises in about a mile on to a higher terrace, which the writer had termed "Upper Ambersham," but is better called the Harefield terrace, the name used in the Middle Thames by Prof. Hare. The level here is 257 feet. To the south-west the terrace looks perfectly flat for a mile, then abutting on a bluff rising to 285 feet at Poole reservoir, a fragment of the Sicilian terrace. A tramp of half a mile north-east reaches a railway cutting across the bluff to the Ambersham, in which channels filled with gravel are well displayed.

During return a stop was made at Constitution Hill, on the edge of the Ambersham terrace, to have a view of Poole Harbour and its surroundings. The complicated landscape has not yet been fully explained, but, to the west, the Nautical College is on a fragment of the Iver terrace. The spire of St. Mary's Church stands at the edge of a ridge of First Taplow; Brownsea Island is Second Taplow. More interesting are the marine platforms of the Purbeck Hills. The top of Old Harry Rock is Taplow. Above it foreshortening obscures the profile up to the 200ft. or Ambersham platform, which is fairly clear. From it rises a strongly marked flat half a mile long, which looks quite level, but actually descends from 435 to 380 feet. This is one of the best known marine platforms, described by Reid in Cornwall more than 50 years ago. Its presence near Bournemouth was first noted by Mr. Bury.

The next higher ridge is believed to include two platforms found close together in Devon, termed by the writer the 505ft. and 530ft. terraces. A still higher platform near 600ft. has been rounded off to some extent.

Mr. W. J. Read has very kindly read the manuscript of this paper and removed several obscurities.

Chemical and Bacteriological Notes on the Blue Pool, near Wareham, Dorset

By A. S. CARLOS, B.Sc., F.R.I.C.

The Blue Pool is situated about 2½ miles S.S.E. of Wareham, and left of Furzebrook Lane, about 1½ miles from its junction with the Wareham-Corfe Castle Road. It stands at an altitude of just over 150 feet above sea-level and is one of a number of pools in the triangle bounded by the main Corfe-Castle Road on one side, the by road from Stoborough to Creech Grange on another, and the escarpment of the Purbeck Hills on the South.

The Pool was originally a claypit, and there is evidence of the pit having been in operation until about 1874.

The area of the Blue Pool is approximately 2½ acres, being about 200 yards in length and from 60 to 70 yards in width. Its depth, when measured in 1924, was estimated at 52 feet, but recent soundings (taken by a Troop of Sea Scouts from Weymouth) seem to show that it is now only about 34 feet deep. These variations in estimated depth may be due to inaccuracy of measurement, or more probably to silting up. Moreover, the bottom of the Pool is in all probability not flat, but is in the form of ledges left by the original workings.

(A) **Geological Features of the Area.**

The particular geological formation outcropping in this area belongs to the Bagshot Beds, which cover the plain and heathland lying to the North of the Purbeck Hills, and extend from beyond Wool to Poole Harbour.

There are three main series of these beds :—

(1) The Aggleston Grit, having a depth of fifty feet or more.

(2) The Pipeclay Series, extending from about 135 to 250 feet in thickness.

and (3) The Redend Sandstone, somewhere about 140 feet thick.

The Agglestone Grit is an extremely coarsely bedded and pebbly grit, which is seen at Studland and derives its name from the area to the West of Studland so called.

The Pipeclay Series is the principal surface-forming rock of the heathland to the North of the Purbecks, and it is the source of "Ball" and other clays.

The Redend Sandstone consists of the brilliant red and yellow soft sandstone seen at Redend Point, Swanage.

(B) **Clay Working.**

This area has been the centre of an industry which is only second in importance to the Portland Stone industry of the Isle of Purbeck. The plastic Clays of these beds have certainly been worked continuously from Roman times. The term "ball clay" derives its name from a special type of spade which has been used for the digging. This measures about ten inches in length and by its use chunks of clay weighing thirty to thirty-five pounds and called "balls" are dug out.

The best beds are usually only about eight to fourteen feet thick and are separated by layers of shale or by carbonaceous beds containing so-called "rubbish clay" and sands.

The clay workings in this area occupy a belt about five miles long and one mile wide, and this is now covered with a great number of old surface workings. Many of the hollows left by these workings are filled with surface water and thus form lakes, pools and marshes. There are many banks formed by tip heaps from the workings, and these are sparsely overgrown with heather and bracken.

Altogether, eleven such pools are shown on the Ordnance Map south of the Purbeck Hills and within about one mile radius of the Blue Pool.

To reach the clay in these old workings, much overlying material, consisting of sand, rubbish, clays, etc., was removed by hand, at a time when labour was very plentiful. In some cases, 30 to 40 feet of material was dug in this way before the clay seam was reached, and in order to get to the bottom of the pit long ramps were dug and used for drawing up trucks containing the material.

In "Picturesque Ramblings in the Isle of Purbeck," by C. E. Robinson, published in 1882, an illustration is given of clay working, and a pit is shown similar to that of the Blue Pool. This shows a huge surface excavation dug in stages by hand, and having a long slope leading to the bottom of the pit. The water which collected was drained to a sump and removed by pumping.

(C) The BLUE POOL.

The sides surrounding this Pool show how the Bagshot Beds, like many others, can alter over very short distances. They show false bedded sands and grits alternating with rubbish clay, and at the east end of the Pool there is a bed of ironstone, which thins out towards the west. Much of the banks, and particularly that on the North, is apparently formed from the material dug out during the process of working.

The water in the Pool is undoubtedly surface water, and possibly water percolating from pools at higher levels. According to information, the water level varies a number of feet according to conditions of rainfall.

(D) Examination of the Water.

Samples of water were taken from a depth of eight to ten feet from the surface at a distance of six to eight feet from the edge on the north side, where the bank slopes very steeply. The examination of these samples has been divided into three sections:

(1) Chemical analysis;
(2) Bacteriological examination; and
(3) Microscopical examination of the deposit.

(1) **Chemical Analysis.**

The general chemical analysis, expressed as parts per 100,000, was found to be as follows:—

General.

Ammonia, free	0.0005
,, albuminoid	0.0100
Nitrites	Absent
Nitrates, as Nitric Nitrogen	0.066
Oxygen absorbed by Potassium Permanganate at 80° C. in 15 minutes	0.0386
Oxygen absorbed by Potassium Permanganate at 80° C. in 4 hours	0.0719
Chlorine	2.15
Hardness, temporary, as Calcium Carbonate	0.50
,, permanent	4.50
,, total	5.00
Total Solids, dried at 180° C.	12.80
Ph. Value	7.1
Metals	Trace of Iron
Colour	Colourless *and* Clear
Odour	None

Dissolved Gases.

This water contains free carbon dioxide and dissolved oxygen in the following quantities:—

Free Carbon Dioxide	1.998 parts per 100,000
Oxygen	0.555 ,, ,,

These figures when expressed in volumes represent—

Carbon Dioxide	0.505 c.c. per 100 c.c. of water
Oxygen	0.039 c.c. ,, ,,

After a five days' Closed Test at 20° C., the dissolved oxygen was found to be 0.520 part per 100,000, showing a decrease of only 0.035 part during the five days.

Estimation of Mineral Constituents.

On analysis, the total solid matter in the water was found to be:—

		Parts per 100,000
Cathions:	Calcium	1.43
	Magnesium	0.78
	Iron	0.08
	Aluminium (as Al_2O_3)	0.02
	Alkalies (as Na_2O)	1.19
	Silicon (as SiO_2)	0.71
Anions:	Carbonate (CO_3)	0.39
	Sulphate (SO_4)	5.18
	Chlorine	2.15
	Nitrate (NO_3)	0.29
	Phosphate	Nil
		12.22

These figures, when calculated into the saline constituents of the water, show :—

	Parts per 100,000
Calcium Carbonate	0.50
Calcium Sulphate	4.17
Magnesium Sulphate	2.80
Magnesium Chloride	0.87
Sodium Chloride	2.48
Sodium Nitrate	0.50
Ferrous Carbonate	0.17
Alumina ..., ...	0.02
Silica	0.71
Organic Matter and Loss	0.58
	12.80

REMARKS.

The quantity of Free Ammonia in this water is exceptionally low, and the figures for Albuminoid Ammonia and for Oxygen absorbed by permanganate at 80° C. indicate that this water is of fairly high organic purity. This is also confirmed by the fact that only 0.035 part per 100,000 of the dissolved oxygen present in the freshly sampled water is used up by the organic matter when the water is allowed to remain in a closed bottle at 20° C. for a period of five days.

The figure for chloride is about normal for a surface water in this area, and the value for hardness shows that it is a soft water. The total solids figure is low, and similar to that found in many surface waters. The iron present, expressed as Ferrous Carbonate, is very small.

(2) **Bacteriological Examination.**

The total number of organisms present in the water was obtained by cultivating both on gelatine media at 20° C. and on agar-agar at 37° C. The water was also examined for coliform organisms by the method laid down by the Ministry of Health. The results were found to be :—

TOTAL ORGANISMS.

(a) Grown on Gelatine at 20° C. for 3 days—540 per cc.

Total number of Liquefying Organisms present—22 per cc.

(b) Grown on Agar Agar at 37° C. for 3 days—374 per cc.

EXAMINATION FOR COLIFORM ORGANISMS.

(a) Presumptive Test :—Macconkey's Bile-Salt-Glucose Broth, after inoculation with varying quantities of the water and incubation at 37° C. for 48 hours, gave the following results :—

1 tube of 50 cc. of water—Acid and Gas observed.
5 tubes of 10 cc. of water—Acid and Gas observed in 4 tubes.
Negative in 1 tube.
5 tubes of 1 cc. of water—Acid and Gas observed in 1 tube.
Negative in 4 tubes.

From these figures the probable number of coliform organisms in the water would be 17 per 100 cc.

(b) Classification of Coliform Organisms:—The differential coliform test was carried out by the usual technique of cultivating the organisms produced in the tubes of Macconkey's Media shown under (a) of this Section on an Agar plate; from the colonies obtained, sub-cultures were made in glucose-phosphate broth for both the methyl red test and the Voges-Proskauer test, and in citrate media and peptone water for the indole test.

The reactions obtained were:—

Methyl Red Test	Negative
Voges-Proskauer Test ...	Positive
Citrate Media	Positive Growth
Indole Test	Negative

These tests indicate that the coliform organisms belong to the group of Bacteria Aerogenes Type 1. These organisms are mainly derived from vegetation.

These results are not unduly high for a water of this type, and the standard very nearly approaches that of many drinking waters.

(3) **Microscopical Examination.**

The deposit from various samples of the water when separated and examined under the microscope, showed the presence of very fine angular sand grains, together with various organisms common to fresh water. There was an entire absence of vegetable débris. The organisms identified were:—

Diatoms.
Desmids, particularly *Closterium.*
Unicellular green algae, probably *Ulothrix.*
Small ciliated protozoa (*infusoria*).

A few macroscopic water insects were seen at the time of taking the sample of water from the Pool. These were not identified.

The only vegetation apparent on the banks of the Pool was a coarse green type of grass, which was seen growing in small tufts under the water.

(E) **Colour and Life.**

There has been much controversy as to the reason for the colour of the Blue Pool, and a popular belief prevails that no life exists in its waters.

The colour varies from time to time; on certain days, not cloudless ones, the water appears deep blue, while at other times it varies to a sea green, and has a turbid appearance. In "Geology of the Country around Weymouth, Swanage, Corfe and Lulworth," published by the Geological Survey Office in 1947, a statement is made that the Blue Pool owes its colour to the *great depth of clear water* and the white clay bottom.

At water works where purification is carried out by chemical precipitation, the water is often allowed to settle in large concrete reservoirs, with the result that a fine white deposit is thrown down on the bottom and the sides. In such cases, the water appears to be deep blue in colour. In these reservoirs, *the depth of water is not great*, but usually only fifteen to thirty feet. This is presumably a similar condition to that at the Blue Pool. The clay, which is very fine and white, undoubtedly forms a layer on the bottom and sides, and as a result of this, and diffraction of light, the water appears to be blue. This condition is not found in other pools in the neighbourhood, because they all have vegetation growing round the sides and in the water, and the deposited material is not white. The blue colour is optically due to ultra microscopic particles in suspension in the Pool.

So far as life in the Pool is concerned, the chemical analysis indicates that it would be possible for both fish and vegetable life to flourish there, provided there was sufficient food in the water. The bacteriological examination shows that the water is far from sterile, and the fact that it contains various forms of life proves that poisonous substances are not present.

The almost entire absence of organic matter, as shown by the chemical analysis, and the fact that the banks are mainly sand and clay, are unfavourable to growth, although they do not prohibit it.

Other pools in the district, and particularly one about 500 yards from the Blue Pool, show much vegetable life, but in all these cases there is abundant growth practically down to the edge of the water, with the result that the foods necessary for life are provided in the water.

In conclusion, it may be summed up that the peculiarities of the Blue Pool are not due to any specific properties of the water but are caused by its unique position and surrounding banks.

As an experiment to ascertain whether growth in the water was prevented by the deficiences of mineral ingredients, such as phosphates, a number of samples were taken and allowed to stand, undisturbed and exposed to light and air, for a considerable length of time. It was noticed that growth gradually developed, green algae being formed in each sample. Microscopical examination of the deposit after 9 months revealed the presence of green uni- and multi-cellular algae, including *Crenothrix* in the sporing condition. There was also a very considerable quantity of living diatoms and small protozoa (infusoria).

The fact that growth, not only of algae but also of other forms of pond life, takes place in the water of the pool, definitely disproves the hypothesis that a deficiency, or complete absence, of certain mineral substances is responsible for the apparent absence of life in the Blue Pool. The growth of living forms is certainly retarded, and the only possible reason would appear to be the lack of organic matter in the water.

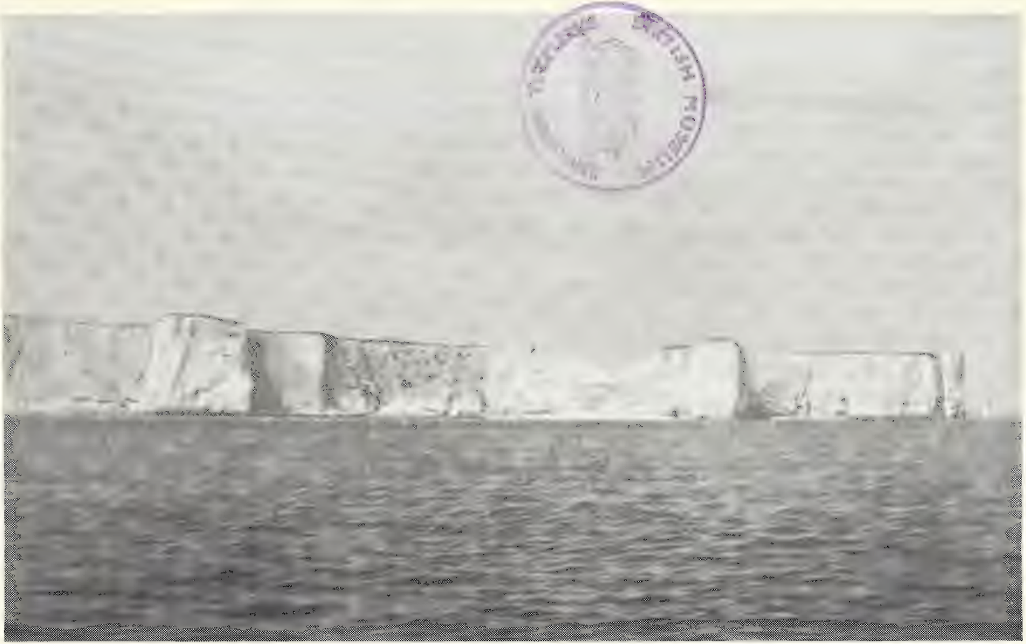
Note by H. E. Clarke, M.A., B.Sc., F.R.I.C.

The early investigations of Brücke and Tyndall served to show that the apparent colour of many natural waters should be assigned to the diffraction and dispersion of incident sunlight, brought about by particles, sometimes of microscopic dimensions, suspended in the water.

Later work proved that clear, fresh or salt waters absorb light, and that when white light traverses water the rays of greater wave lengths (i.e., towards the red end of the spectrum) are more readily absorbed than those of shorter wave lengths (i.e., towards the violet end). Thus white light at the surface of still water becomes green, blue and indigo as one moves to increasing depths.

In order that these optical phenomena may be apparent to an observer studying them above the surface of the water, it is essential that the affected rays should be reflected back to his eye. This may be done experimentally by immersing white or polished surfaces at known depths below the surface; or the reflection may be automatically achieved by naturally occurring reflectors, such as the bottom on which the water stands, or the optically effective suspended particles themselves. Still water reflects only about five per cent. of incident daylight from its surface, and thus while the moving surface of the sea reflects much light received from the sky, the still surfaces of lakes and ponds are able to *transmit* most of the light they receive from above and return it after it has suffered scattering and dispersion. The most marked optical effects are presented by lakes and ponds whose waters carry much finely suspended material, such as colloidal clay or silica, and whose bottoms being pale or white in colour can reflect the light received there back to the surface. The Blue Pool is an old clay working providing all the prerequisites for a more or less uniform blue colour. The bottom of the pool, except at its edges, is devoid of humus, and consists of freely-reflecting sand and clay. Neighbouring clay pools of similar history, but of much lesser dimensions, have received from surrounding trees and vegetation material for a fertile and non-reflecting bottom, and consequently are not blue pools. The time may come when the Blue Pool of to-day will present similar features and cease to be a curiosity. At the present time coarser particles of clay and silica are stirred up from the bottom of the pool at each heavy rain, giving a milkiness to the water by reflected light. These coarser particles settle again in the calm, dry intervals, but the optically-effective particles settle very slowly or not at all. The development of sessile plants will in course of time materially reduce the tendency for the bottom to be disturbed by rains.

Mr. Carlos's study of the smaller organisms contained in samples of water taken from the Pool disposes of the allegation that it is sterile. His analysis shows that the water contains no plant or animal poison, while it does contain the salts normally found in natural waters and fitted for the growth of living organisms. Any observer can satisfy himself that along the edges of the Pool green plants already flourish where they are able to secure anchorage.



BRITISH MUSEUM

HANDFAST POINT AND OLD HARRY ROCK, 1906.

HANDFAST POINT, 1949 (Old Harry just showing on right)

Erosion at Handfast Point

In the summer of this year Miss Whitaker noticed that a cave had completely penetrated the largest stack at Handfast Point, so that light could be seen through it.

It was plain that a new episode had opened in the history of the erosion of the Chalk at the Point. The serious effect of coast erosion in the Tertiary sands and clays of Poole Bay is well known and attested, but little is recorded in connection with erosion in the much harder Chalk, though the subject is of importance, as the Chalk protects the softer beds behind it.

Mr. S. Whitaker, Senior, managed to obtain on August 24th the fine photograph here reproduced, showing the tunnel at the shore-line in the centre of the stack. Mr. W. J. Woodhouse has supplied from his collection of local photographs a picture of Handfast Point taken in 1906. It will be seen that next to the gap between the large stack and the mainland was a rectangular buttress of chalk, obviously shaped by joints. Half way between the buttress and Old Harry the incipient cave san be seen. In the latest photograph the buttress has been nearly consumed and the cave has become a tunnel. Now that the stack has become a natural arch, its bipartition is only a matter of time.

Mr. Woodhouse records that "Old Harry's Wife," a nearby stack, was broken in half during a gale about 1896. The remains can be seen on the right of the 1906 photograph. The stump totally disappeared in 1923-24.

A question of interest is why the marine erosion appears to be more effective at some distance from the seaward point, now represented by Old Harry Rock. It has been suggested that it is due to greater abundance there of beach material which has been swept past the point, so that Old Harry is battered only by waves comparatively unarmed with stones. The problem is worth investigation by our members.

Ground Ice in the River Avon

By W. J. READ, M.Sc., F.R.I.C.

During the winter of 1946-47 there was some correspondence in the "Bournemouth Echo" concerning Ground-ice in the River Avon. It appears that the ice forms at the bottom of the river before it appears on the surface of the water. Reliable reports had been received that this had occurred on numerous occasions on the Avon. This formation of ice at the bottom of rivers or ground-ice as it is called is a peculiarity of certain rivers and is so contrary to normal experience that some investigation was called for.

When water freezes, the ice is normally formed at the top. The reason for this is evident, for when water cools, the colder water sinks to the bottom, being denser than the remainder. This goes on until a temperature of 4°C. is reached—at this temperature water has its maximum density—and any further cooling results in the colder water remaining at the top, as water near zero is lighter than at 4°C. Further cooling from the air causes the surface to freeze and the water becomes covered with a sheet of ice. This is the normal procedure and there is something anomalous in the formation of ground-ice.

The criticism most often met with is that there has been faulty observation and that any gravel or stones found in the ice is due to freezing in the shallows, the ice being subsequently washed down.

To counter these criticisms contact was made with as many reliable observers as possible and I can quote from the following:—

Mr. P. J. Wildsmith,

Engineer, Ringwood Electric Supply:

" In the case of the Avon it is a fact that ice forms at the " bottom of the river before it appears on the water's surface. " This I believe is due to the surface water being agitated by " wind and flowing at some speed. The ice is not seen to rise " until 12 degrees of frost or over are registered. The ice rises " to the surface in a spongy mass, flows down the river, eventu" ally clinging to the sides of the bank and closing in from both " sides until the ice meets.

" My Company's water turbines suffer considerably during " such weather. The rotors being under water, become one ball " of ice and cease to have any power. It is interesting to see " tools such as picks, shovels and rakes, which have been acci" dentally dropped in the river, rise to the surface, one solid " mass of spongy ice.

" Growing weeds, together with their roots, are brought to " the surface and the writer has seen a whole brick rise from the " bottom encased and float downstream."

Mr. W. H. Mooring Aldridge,

Clerk to Hampshire Fishery Board:

" The Salisbury Avon is one of the few rivers which freeze " from the bottom upwards, and I have had personal experience " of this. In February 1929 it was very noticeable and also in " the cold winter of 1917, and an inspection of this rough ice " will often show pebbles and weeds from the bed of the river " imbedded therein.

" It has been noticed that until minima temperatures fall " below 20°F. there is little or no ground ice, but in periods of " very severe weather when there are clear skies at night, and air " minima of 15°F. or less, ground ice forms and breaks away " from the bed of the river, floats to the surface, and then downstream, the amount of the ground ice increasing with the " severity of the weather."

" During the very cold winter of 1947 there was no trace of " ground ice, the reason being that although the weather was " persistently cold, it was generally cloudy, with the result that " the night minima never fell below 20°F.

" When the weather becomes less severe, or a thaw takes " place, ground ice very rapidly disappears."

Mr. T. Ward Whitfield,

Engineer to the Avon and Stour Catchment Board:

" I have never actually seen ' Ground ice ' in the River Avon " although I am quite satisfied from information received from " reliable sources that it does occur.

" I have heard of it giving trouble at East Mills, and also " at Standlynch (Wiltshire)."

Mr. L. Sturdy,

Chairman of the Avon and Stour Catchment Board, says that he quite confirms the occurrence of ground-ice in the Avon from time to time but was unable to give actual times and dates. He has also experienced it with his own water turbine in the river Piddle at Trigon above Wareham.

Mr. D. Llewellyn,

West Hants Water Company:

" I am well aware of the formation of Ground-ice in the " River Avon, as, in the past, we have had considerable trouble " with it at Knapp Mill, and I have handed you two photographs " taken above Knapp Mill showing the appearance of the river " when the ground-ice has risen.

" No experienced person could mistake ordinary surface ice " for ground ice even if the former came from the shallows and " contained pebbles. It is more of a mushy character and quite " unlike the glassy structure of surface ice.

" It only occurs after a very cold spell, sufficient to bring " the river water down to freezing point and is found to follow

" clear bright nights when many degrees of frost are registered. " During the following morning it rises to the surface and on " several occasions we have had to employ a team of men to " keep clear the racks above our turbines."

So far, evidence has been found of ground-ice formation on the Avon at Christchurch, Knapp Mill, Bisterne, Ringwood, Ibsley, Sandy Balls Wood, Fordingbridge, and at Standlynch near Downton. It may occur higher up but information has been specially sought for that part of the Avon in Hampshire.

Conversations with local inhabitants showed that those who have worked on or near the river for many years were well aware of the formation of ground ice although they had not seen it for many years. One specifically mentioned Sandy Balls Wood above Fordingbridge as a place he had seen it. This is confirmed by Mr. T. Ward Whitfield's statement as Sandy Balls Wood is near East Mill, Fordingbridge.

The general conclusions from correspondence and interviews can be set out—

(*a*) There must be a sufficiently long spell of cold weather to bring the water temperature to about freezing point.

(*b*) Subsequently a minimum degree of frost is necessary. This minimum was never put at less than 12 degrees of frost and some thought it seldom occurred with less than 20 degrees of frost.

(*c*) It generally occurred after exceptionally clear nights, (Whether this is due merely to the naturally lower temperature on such nights or is due to special radiation conditions reamins to be decided.)

(*d*) True Ground-ice is of a spongy nature quite easily distinguished from surface ice and an experienced person is not likely to confuse it with surface ice from shallows washed down in the thaw.

(*e*) It has actually been seen to rise from the bottom and also bring up objects and material from the bottom.

The above evidence concerning Ground-ice in the Avon seemed conclusive, and literature was examined to find what other rivers had exhibited similar phenomena.

River Thames.

Dr. Plot, the first keeper of the Ashmolean Museum at Oxford published in the year 1677 a famous work on the Natural History of Oxfordshire, in which he refers to the freezing of the Thames in the following words:—"I find it the joint agreement " of all the watermen hereabout that I have yet talked with, that " the congelation of our river is always begun at the bottom, " which, however surprising it may seem to the reader, is neither " unintelligible nor ridiculous. They all consent that they frequently meet the ice-meers (for so they call the cakes of ice " thus coming from the bottom) in their very rise, and sometimes " in the underside include stones and gravel."

Thames Commissioners Appendix 1 1866 also mention the formation of ground ice in parts of the Thames.

Ireland's "Picturesque Views of the River Thames," published in 1792. also refers to the Ground-ice in that river.

Scottish Rivers.

Rev. Dr. Farquharson published two papers in the Philosophical Transactions of 1835 aid 1841 on Ground-gru as the Scots term their ground ice. Observations were made on the Rivers Don and Leochal in Aberdeenshire.

Other Records.

In 1833 M. Arago published a paper in the Annuaire du Bureau des Longitudes in which he mentions ground-ice being observed in the Thames by Hales in 1730 in the River Deonie in France in 1780, in the Elbe by Beaun in 1788, in the Teine, Herefordshire, in 1816, in the Rhine at Strassburg in 1829 and in the Seine in 1830.

It would appear from these records that the phenomenon is more widespread than at first appears, but we must look to America to find it occurring on a scale causing serious difficulties.

It is well known in the Mackenzie River, the Upper Mississipi and the St. Lawrence River. The last named is probably the most notable case of ground-ice causing flooding and other difficulties. When ice is formed it takes up more room than the water from which it is constituted, so that 9 cubic feet of water become 10 cubic feet of ice; thus when ground ice is formed an increase of bulk occurs—further this ground ice formed on the bottom reduces the effective size of the channel and the two effects acting together cause much flooding. Fortunately the cold in this country is rarely severe enough to cause much flooding from frost action.

The problem of ground-ice with special reference to its control on the St. Lawrence River has been carefully studied by Prof. Barnes, of McGill University, Montreal.

Why Ground-ice is Formed.

Having considered the evidence for the existence of Ground-ice it is of interest to consider the conditions under which it is formed.

The Encycloædia Britannica 14th Edition gives the following note which covers the main principles involved:—

" Ground-ice, ice formed at the bottom of streams while the temperature of the water is above freezing point. Everything points to radiation as the prime cause of the formation of ground-ice. It is formed only under a clear sky, never in cloudy weather; it is most readily formed on dark rocks and never under any covering, such as a bridge and rarely under surface ice. Prof. H. T. Barnes, of McGill University, concludes that the radiation from a river bed on cold and clear nights proceeds through the water in long rays that penetrate much more easily from below upwards than the sun's rays from above downwards, which are mostly absorbed by the first few feet of water. On a cold, clear night, therefore, the radiation from the bottom is excessive and loosely-grown spongy masses of anchor ice form on the bottom. On the next bright sunny day, heat from the sun may detach them and they will rise to the surface with considerable force. Probably a thin film of stationary water rests upon boulders and sand over which the stream flows and this, becoming frozen owing to radiation, forms a foundation for the anchor ice and produces a surface upon which the descending ' Frazil Ice ' can lodge.

" The ice which rises to the surface has a spongy texture and frequently carries gravel with it. This anchor-ice as it was called by the Canadian Trappers frequently forms dams across narrow portions of the rivers where the floating masses are caught. Dr. H. Landor pointed out that the Mackenzie and Mississipi rivers carry ground ice from the head waters for a considerable distance downstream.

" Frazil-ice is a Canadian term. It is a surface ice formed in spicules and carried downwards in water agitated by winds or rapids. The frazil ice may render swiftly moving water turbid with ice crystals and it may be swirled downwards and accumulated upon the ground-ice or it may be swept under the sheet of surface ice, coating the under surface of the sheets to a thickness as great as 80 feet in loose spicular ice."

Further consideration shows that we must admit the formation of ice of three types.

(*a*) Sheet ice or normal surface ice, calling for no further consideration.

(*b*) Anchor-ice or Ground-ice or Ground-gru, a type forming on the bottom.

(*c*) Frazil ice or fine spicular ice floating in the water and frequently adhering to ground-ice and increasing its bulk.

The best description of Anchor-ice is that given by Farquharson.

" The ice formed at the bottom does not resemble the solid glass-like plates which are formed on the surface. It has nearly the aspect of the aggregated masses of snow as they are seen floating in rivers during a heavy snow shower, but on taking it out of the water it is found to be of a much firmer consistence than these, although never approaching the solidity of surface ice. When the ice begins to form on the bottom of the streams it roughly resembles little hearts of cauliflowers fixed on the bottom with coral like projections. They are dispersed irregularly but increase till the whole bottom is covered, and if the frost continues, grow in height in an irregular manner so as to obliterate the earlier somewhat symmetrical shapes."

There is no doubt that this anchor-ice occurs only when the following conditions have been complied with ;

(*a*) Water at near freezing point,

(*b*) Clear water,

(*c*) Night temperature with more than 12° of frost,

(*d*) Cloudless skies at night to assist radiation,

(*e*) Some factor concerning the bed of the stream making it favourable for radiation. Mud is definitely not favourable.

Calculations have shown that, with clear water and clear skies, radiation into space cools the bed of the stream sufficiently to account for the formation of very large quantities of ground-ice, while the conduction of heat through the stream bed is almost negligible and insufficient to melt more than a tiny portion of the ice formed.

The rising of these masses to the surface occurs when the day radiation from the sun causes partial melting and loosening of the masses, so that the lower Specific Gravity of the masses enables them to break away and rise to the surface.

Frazil-ice generally occurs at the same time as Ground-ice but its conditions of formation are somewhat different. The spicular crystals are formed in an agitated water, and spraying into the air at a temperature many degrees below freezing assists its formation. It is somewhat similar to the formation of ice cream with constant stirring, which causes the formation of small crystals of ice. The rapidly moving and agitated water maintains these crystals in suspension, and where ground-ice is formed the crystals readily adhere and add to the mass, and so cause rapid increase in bulk.

Some Changes in the Face of the Dorset Countryside since 1910

By H. DE CASTRO.

The alterations on the face of the County in the last 40 years have been many and varied. Most have been beneficial but a few very detrimental; nearly all have been dictated by economics. It has been rightly stated that changes in the face of the land have been as fast in the last ten years as in the previous fifty.

The three Sciences, Geology, Botany and Zoology have helped each in their sphere, by modern methods, improvements, and discoveries.

Firstly, let us mention the most evident among the Geological changes. These are few and mainly detrimental from a scenic point of view. The new quarries between Langton Matravers and Kingston are the result of the demand for building stone. The top strata of stone is in keen demand for crazy paving to be seen in so many modern garden layouts. The continued expansion of the Purbeck Ball Clay pits will certainly alter the face of a limited area near Creech Barrow. The last change of any extent noticeable is the opening of gravel pits on the Great Heath. Fortunately this scar to the beauty of Egdon can be and is being controlled by the Town and Country Planning Act. The increasing demand for washed gravel in all modern building and the working out of the Newtown pits has driven the digging to parts untouched before 1918. The road from Worgrett Hill to Tincleton was wild heath road with only one cottage in six miles till the heath ended at Oakerswood. To-day the change is great and detrimental to the beauty of the scene—gravel pits and brickworks with attached buildings of a temporary nature. The loneliness has gone, the scars will remain evident for years.

Secondly, let us consider the visual Botanical effects, which are sometimes striking and at others may be of a radical nature and yet not to be comprehended by the passer-by. The Botanical changes again can be put under three headings, i.e.: Arboriculture; the sowing and harvesting of Cereals; and the sowing and raising of the extensive family of Grasses, with which I will include the leguminous plants which in to-day's agricultural economy play an ever increasing part.

The Arboricultural changes result from the heavy planting of trees of the Coniferous Family on tracts of the Great Heath by the Forestry Commission. Take the road from Wareham to Bere Regis, which was once almost a completely open road, and now is in a large part about to become a landscape of Pines so frequently to be seen only north of the Clyde and Forth. With the present price of timber it pays to buy woods, fell the standing crop and abandon the land to Nature. This is a very difficult question to deal with. High cost of clearing is the trouble; but it is going to be a bad blot on many a scene that was once beautiful. As for Cereals, with the extended use of the plough, much land is now compelled to be sown with corn; and with the almost complete mechanization, especially in Dorset, new sorts of wheats, oats, barley have been bred and brought to perfection, mainly by the School of Agriculture, School of Botany, Cambridge. The aim is for earlier maturity, stiffer straw and shorter straw in all three cereals. This has in the main been accomplished. While as for Grasses, the chief idea now is to extend the grazing season at both ends, earlier and later growths being required to give longer natural feeding. Drought resisting plants are also sought after. Here again, Aberystwyth University College of Wales has revolutionised the technique of grass culture, especially in White Clovers, Rye Grass, Timothy, Cocksfoot and Fescue varieties. More Sainfoin, Vetches and Lucerne are to be seen in the West owing to their success in bulk of production and frequency of cutting for the now increased use of silage making. Many new and improved grasses are now imported from New Zealand.

The last Botanical change, perhaps the most noticeable of all, is the decreasing fields of swedes, turnips and mangolds. Again the high cost of production and the substitution are playing their effects. Kale, in both Marrow-Stem and Thousand-Headed varieties have mainly taken the place of the root break. Potatoes are now a sight on almost any farm. The acreage to be grown is allotted to each holding by the County Agricultural Executive Committee. This is a very brief survey of a vast economic change.

Lastly, what do we see in the sphere of Zoology? new breeds of cattle; a very great decrease in the number of horses and sheep; in a few places no rabbits. As to cattle, there has been a great increase of herds of Frisian or Black and White for their high milk yields, though up to 1914 very few herds existed of this breed in the West of England. Yet now even they have to fight for favour against the Guernsey and Ayrshire breeds. Whom have these new-comers displaced? The English Dairy Shorthorn, once 90 per cent. of the Dorset Milking Cow, and the very old North Devon beef breed, mainly to be found west of Dorchester. Once more economics answers the question. The increasing demand for milk and the monthly milk cheque, plus the slow turnover of money in beef production, makes Guernseys and Ayrshires much more profitable. The once very prominent hurdle flocks of sheep on every arable farm have gone, except for ram breeding flocks on a few farms. Here again it is the high cost of production in all departments, and controlled prices of wool and mutton. Fertility of the soil can be maintained by the ploughing in of old grass leys, so sheep and their expensive feeding with oil cakes has now ceased to be necessary to maintain this side of farming. Between Blandford and Shaftesbury, twelve miles in all, there used to be 4,000 breeding ewes, now none at all can be found. The very old breed of Dorset Horn Sheep are very seldom now seen. The Dorset Down and Hampshire Down breeds are mainly limited to ram breeding flocks for the sale of rams for crossing with other breeds. One last word to the Naturalist who takes an interest in British Reptiles. Every condition to-day points to the virtual extinction of the Coronella Austriaca or Smooth Snake in its very limited habitat, the Dorset Heath. Firstly, by the extended use of the Heath by the Royal Tank Corps, and secondly, through the great increase of heath fires. These two conditions may also effect the breeding in Dorset of the Nightjar or Goatsucker.

Forest fires in recent years have laid low various landmarks. The one most noticeable to residents of Poole and Parkstone is the gradual disappearance of the fine clump of Pines on the rising ground behind Arne. These trees were growing on extensive peat beds which were burnt through some 20 years ago. Now the trees are nearly all gone, and with them the extensive Heronry which was situated in their tree-tops.

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